Vol. X FEBRUARY, 1920 No. 2

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Winslow's Editorial on Salaries of Health Officers

Hemenway on Economics of Health Administration

Van Dine and LePrince on Anti-Malarial Measures,

And Pierce on Venereal Disease Control

REMEMBER THE SAN FRANCISCO MEETING, A. P. H. A. AUGUST 30, SEPTEMBER 3, 1920.

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Vol. X FEBRUARY, 1920 No. 2

ECONOMICS OF HEALTH ADMINISTRATION

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District Health Officer, Springfield, Ill.

Read before Section on Vital Statistics, American Public Health Association, at New Orleans, La., October 28, 1919.

Health administration lies at the foundation of economic prosperity. It is a business and like other business is subject to commercial laws. Quality, whether of brain or brawn may be appraised by the wages paid. Loss from disease, does vary with the money spent. Compared with fire fighting health appropriations are grossly inadequate, whether the health risk is considered or the actual loss.

FERTILITY of soil, richness of mines, and abundance of resources for manufacture are only available in proportion as the people are strong and active. It is the special function of the health department to prevent sickness and untimely death, and particularly to wage war against those communicable diseases which attack large numbers, and against whom individual effort is inefficient. Health administration is, therefore, at the foundation of economic prosperity.

Public health administration is a business. As such it is subject to ordinary commercial laws, may be judged by commercial standards, and compared with other lines of economic activity. In the business world a concern is considered successful when it so applies scientific knowledge that it produces the greatest output with the least expenditure of money, labor, and material.

The one measure which is used as the gauge in commercial life is money. Material is valued according to its cost. Labor, whether of brain or brawn, may be appraised by wages paid. The product likewise is estimated according to the amount of money which it brings in exchange.

Put in the form of an equation:

$$R = E + P$$

where R represents receipts for product, E indicates expenditures, and P means profits. If R is smaller than E, P becomes a minus quantity, and the business must sooner or later die through exhaustion of capital. A business is successful in proportion as P is large as compared with E.

In the commercial world this last statement is a guiding principle. Though profit may be increased by increasing the outlay, if it be not increased in ratio equal to or greater than the outlay the manager will hesitate and look for other use for his excess of capital. Amount of invest-

ment is largely governed by this general commercial law. Applied, this means that economic rules should guide in determining the amount of appropriation for health departments.

There is an old saw: "A penny saved is a penny earned." In other words, the product may be as truly profit when it represents the saving of loss as when it means excess in receipts. The fences on a farm, preventing the roaming of stock and destruction of crops, are as truly profitable as the sowing of seed and the harvesting of grain. The value of the crops thus saved, and of stock not lost, would be the measure of the value of the fence.

Cities, counties, states and nations do not have unlimited funds for their various activities. Judged according to commercial standards the funds at their disposal should be applied where and in proportion as they will produce the greatest returns, including savings as well as receipts.

The profits of public health administration must be measured by the value of lives saved and the losses which would have resulted from sickness prevented. Unfortunately it is not possible to make exact measurements of the products ot a health department. We must depend upon estimates, with a large possibility of error. We must estimate populations, value of lives, cost and losses through sickness, and even the amount of disease and death. Fortunately for our present purposes the margin is so very large that the greatest possible allowance for error is relatively unimportant.

A year ago an effort was made in Illinois to estimate the loss to each county in the state resulting from the prevalence of certain communicable diseases during the fiscal year ending June 30, 1918. So far as we are aware this was the most extensive computation of the kind which had ever been attempted up to that time, but it was far from satisfactory. Inasmuch as other states have since made computations upon these data, and since they are the basis of our own further studies, it is proper to devote a little attention to the methods used.

Realizing that cases of communicable disease are very imperfectly reported, we first based our estimates solely upon deaths recorded. While this may be satisfactory for a very large area we soon found that a county which had reported over 400 cases of smallpox had no charge for that disease because there were no deaths.

Discovered cases of smallpox are generally reported, but few cases of pneumonia are reported, and the fullness of reports of the incidence of diphtheria, measles, scarletina, and whooping-cough vary according to locality. We took the reported cases of smallpox as the correct number. For most other diseases we estimated the number of cases per death, and if in any county the number of reported cases for a given disease was markedly less than such estimate, we "equalized" by multiplying the number of deaths by the estimated proportion. That is the number of deaths from diphtheria multiplied by ten gave us the estimated number of cases; and pneumonia deaths multiplied by four we took as the number of cases of pneumonia.

Malaria is not likely to arise in some sections of the state. A death reported from that disease in such counties was presumed to have been an imported case or an error in diagnosis, and no addition was made for nonfatal cases. In southern counties a death was taken to indicate 200 cases. Other counties were estimated between these extremes according to location and character of surroundings.

Diseases affecting chiefly children were considered as only of children; and those affecting chiefly adults were considered as all adults. Under normal conditions meningitis should be considered as a children's disease. The year taken for our computation was one in which there were a great many deaths from the

disease in army and navy stations and camps. We, therefore, counted this disease as half adults and half children. The point should be remembered in using our table.

These computations showed a loss in one year from certain communicable diseases in the state approximating $155,000,000, a sum equaling 6.01 per cent of the entire assessed valuation of property, and representing a per capita loss of $24.67. In Kendall county the per capita loss was $124.16, and in Pulaski county the loss was equal to 37.61 per cent of the assessed valuation of property.

These figures show one reason why some communities are poor. "The man with the chill can't work and his farm runs to weeds. The county which needlessly throws away an amount equivalent to from 10 to 35 per cent of its capital must be lacking in funds for ordinary transaction of business.

This same basis of computation was next applied to various cities of the state, adding other elements (Table I). Out of about forty-five cities studied, with the exception of Chicago, Evanston paid the most per capita for health administration, and its loss from communicable disease was the least. It paid 31 cents per capita, and its loss was $12.82 per capita, or 2.71 per cent of its assessed valuation.

Waukegan and North Chicago are contiguous. Waukegan paid 8 cents per capita, for health protection. The losses were:

	Per capita.	Per cent of assesed valuation.
Waukegan	$17.45	9.97
North Chicago..	41.40	19.15

These three cities are all located on Lake Michigan, not far apart, and may well be compared. The comparison tends to show, as more extended studies indicate, that losses from communicable disease vary inversely with the amount spent.

TABLE I.

ECONOMIC LOSSES IN ILLINOIS CITIES DUE TO COMMUNICABLE DISEASES, FISCAL YEAR JULY 1, 1917, TO JUNE 30, 1918.

(Data as to amount of appropriations for health departments were not obtained from most of these cities.)

City	Population	Loss due to Communicable Diseases		Per cent of ass'd val.
		Aggregate	Per capita	
Quincy.....	36,849	$844,955	$22.93	7.28
Kankakee.....	14,289	1,308,435	92.56	29.61
Galesburg.....	24,805	422,945	17.05	5.46
Waukegan.....	21,253	370,700	17.45	9.97
No. Chicago...	4,989	206,580	41.40	19.15
Evanston.....	29,596	379,560	12.82	2.71
Decatur.....	42,409	741,200	17.48	7.43
Bloomington...	27,529	649,670	23.60	7.94
Jacksonville...	15,519	1,125,780	72.54	27.82
Peoria.....	72,184	1,542,720	21.37	6.04
Moline.....	27,976	765,500	27.36	10.41
Rock Island...	30,489	859,945	28.21	10.88
E. St. Louis...	77,613	2,176,750	28.05	14.53
Cairo.....	16,096	991,720	61.60	25.56
Champaign....	15,323	283,355	18.49	6.14
Urbana.....	10,306	250,745	24.33	9.12
Mattoon.....	12,842	298,665	23.26	13.60
Chicago.....	2,571,941	67,435,510	26.21	6.13
Chicago Hgts..	24,070	755,545	31.39	33.24
Cicero.....	21,282	674,455	31.69	10.62
Maywood.....	11,238	162,730	14.48	8.15
Oak Park.....	28,398	426,890	15.03	4.54
Blue Island....	9,548	216,595	22.68	15.19
DeKalb.....	9,816	138,350	14.09	6.61
Canton.....	14,062	209,360	14.89	7.97
Kewanee.....	15,466	286,205	18.50	10.13
Mt. Vernon...	10,164	402,610	39.54	22.21
Aurora.....	35,091	906,655	25.84	9.23
Elgin.....	28,742	899,075	29.19	9.19
LaSalle.....	12,387	372,500	30.01	11.60
Ottawa.....	9,535	439,160	46.06	17.15
Streator.....	14,313	285,450	19.94	10.26
Lincoln.....	11,991	1,352,365	112.78	55.61
Alton.....	25,868	993,565	38.41	19.87
Granite City...	16,752	304,035	18.15	11.63
Centralia.....	11,987	303,505	25.30	14.13
Springfield....	63,375	1,541,390	24.32	9.61
Belleville.....	21,157	567,600	26.83	11.20
Freeport.....	19,844	453,800	22.87	8.09
Pekin.....	11,361	260,025	22.89	9.31
Danville.....	32,969	881,420	26.37	9.07
Monmouth....	10,431	185,920	17.82	6.44
Joliet.....	38,817	1,240,980	31.97	15.11
Rockford.....	57,897	1,316,595	22.74	5.24

Exact comparisons are difficult for many reasons. Methods of bookkeeping vary. In one city collection of garbage and ashes is a duty of the health department; while in another this expense is against the street fund. In some cities the presence of large state establishments such as insane asylums, epileptic colonies and penal institutions, may cause the figures to show unfairly against such municipalities.

Waukegan invested 5 cents more per capita in the business of health protection than did North Chicago, and its loss was $23.95 less, or a profit of 47,900 per cent on its investment. Evans-

ton invested 23 cents more per capita in the business than did Waukegan and its loss was $4.63 less, or a profit of 2,013 per cent. If these figures are indicative of anything they show that health protection is a most paying form of municipal investment.

If it be granted that these figures are any guide, they suggest that there is a point beyond which additional appropriations would not be financially profitable. They also indicate that there will be a residual loss which cannot be overcome by present methods. Both of these suggestions seem to be in harmony with municipal experience in fighting fire. Just where the line between financial profit and loss comes in health appropriations present data are insufficient to demonstrate.

The work of a health department may very properly be compared with that of a fire department. Both are municipal functions. The object of each is to prevent unnecessary loss.

There are also differences to be remembered. In some cities fire losses are recorded in two columns; one for "primary loss," that is buildings in which fire originates with their contents, and the other for "contact loss," that is buildings and contents to which fire has extended from without. Communicable disease loss is all contact loss.

A fire in San Francisco or New York does not endanger property in Chicago or New Orleans; but a communicable disease may be contracted in New York, and its presence in New Orleans or Chicago may not be suspected until after it has spread to other victims.

As in the case of fire, every case of communicable disease serves as a new focus from which infection may spread.

Fire insurance premiums are small where the fire department is efficient, but they are large where the fire equipment is small and poorly managed. The amount spent on the fire department is, therefore, a form of fire insurance. The money spent wisely for the support of a health department is just as truly a form of life and health insurance.

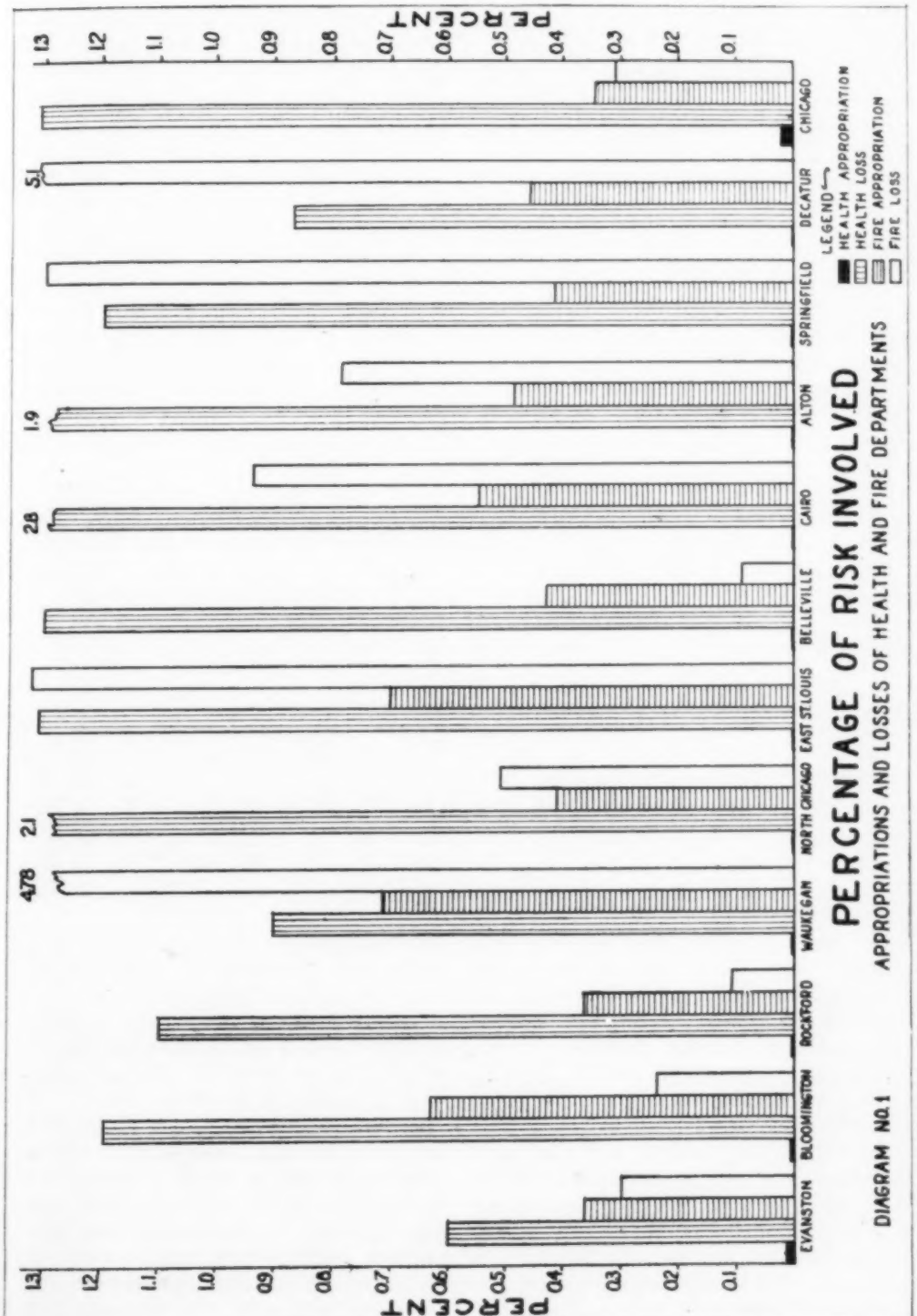
The wise man places his larger policy where the risk is greatest. He more fully insures property which cannot be replaced. Buildings and stock destroyed may be reconstructed, but life once lost cannot be restored, and health shattered may be beyond repair.

Appropriations should bear a direct relationship to the risk. The risk means money value and conditions. The appropriations for a fire department should be greater where buildings are of wood construction, than where most of them are of brick or stone, though the money value may be the same. So local conditions may demand a larger appropriation for health protection in one city than in another having the same number of inhabitants. These special conditions include character of soil and surroundings, water and sewerage arrangements, density of population, and the intelligence and manner of life of the inhabitants.

The twelve cities from which were taken the data for certain special studies are considered as fairly representative. They were selected largely by chance. Chicago was included as the largest city of the state. Joliet, Jacksonville, Kankakee, Lincoln and other cities were omitted, because it was felt that the presence of state institutions modified too greatly the apparent results.

If the life of an adult is valued at $3,000, and that of a child at $500, on the basis of the 1910 census for Illinois the average human life in the state is worth slightly over $2,000. Ignoring the fractional excess, the value of the life risk was, therefore, found by multiplying $2,000 by the number of population for each city.

In these twelve cities the appropriation for health departments in 1918 varied from .0007 to .0227 per cent of the risk, while the loss from communicable disease ranged from .6 to2.8 per cent


PERCENT
1.3
1.2
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0.1
478
21
28
1.9
51
EVANSTON
BLOOMINGTON
ROCKFORD
WAUKEGAN
NORTH CHICAGO
EAST ST. LOUIS
BELLEVILLE
CAIRO
ALTON
SPRINGFIELD
DECATUR
CHICAGO
LEGEND
HEALTH APPROPRIATION
HEALTH LOSS
FIRE APPROPRIATION
FIRE LOSS
PERCENTAGE OF RISK INVOLVED
APPROPRIATIONS AND LOSSES OF HEALTH AND FIRE DEPARTMENTS
DIAGRAM NO. 1

of the risk. See Diagram I, and Table II, columns 3 and 4.

It was practically impossible to get an accurate estimate of the actual value of the fire risk. Instead we satisfied ourselves by taking the assessed valuation of property, realizing that much of this valuation represented land which is not destructable. This assessed valuation is, therefore, greater than the real fire risk, but we found that the fire department appropriation ranged from .346 to 7.01 per cent of the risk, while the loss was from .09 to 5.11 per cent of the risk. Diagram I, Table II, columns 7 and 8.

In a general way we may roughly say that though the life risk was ten times greater than the fire risk the per capita appropriation was ten times greater for fire protection than for health. Diagram II, Table II, columns 1 and 5.

Table II, columns 9 and 10, showing the ratio of loss from disease and fire to the respective appropriations is particularly striking, though it is practically impossible for this comparison to be made in diagram. In Belleville the fire loss, which happens to be all primary loss, by the bye, was only .21 per cent of the appropriation, but the disease loss was 1,892 times the health appropriation. If a column a fifth of an inch high represented the fire loss, it would take one almost 158 feet high to show the loss due to communicable disease. In only one city was the fire loss ten times as much as the appropriation for fire protection, while the best showing for health loss was forty-one times the amount of appropriation.

A study of the tables and diagrams very clearly indicates that as compared with fire protection far too little is appropriated for health departments. This is the conclusion whether we consider the value of the risk involved, or the losses experienced. In other words, in making the appropriations city governments have shown an unwarranted disregard of ordinary business principles.

Carrying these reasonings a little further, in so far as its different lines of activity can be measured, appropriations for a health department should be expended proportionally. In the control of communicable disease the health department has a practical monopoly. In the treatment of the sick, and in conducting clinics, the department is in competition with private practitioners of medicine. In treatment the department is dealing with units. In its preventive

TABLE II

City	Comparison of appropriations and losses, fire and health										Per capita assessed valuation of property
	Health				Fire				Ratio of loss appropriation		
	Per capita		Per cent of risk		Per capita		Per cent of risk				
(Column)	A 1	L 2	A 3	L 4	A 5	L 6	A 7	L 8	Health 9	Fire 10	11
Evanston	$0.31	$12.82	.015	0.6	$1.72	$1.40	.365	.295	41.	.80	$473.416
Bloomington	.13	23.60	.006	1.2	2.09	.77	.027	.233	182.	.36	332 674
Rockford	.08	22.74	.004	1.1	1.60	.47	.365	.109	284.	.29	433.588
Waukegan	.08	17.45	.004	0.9	1.29	8 31	.716	4.780	271.	6.44	174.894
North Chicago	.03	41.40	.0015	2.1	.90	1.12	.417	.510	1360.	.82	216.158
East St. Louis	.13	28.05	.0064	1.4	1.35	2.76	.701	1.431	217.	2.04	192 960
Belleville	.014	26.83	.0007	1.3	1.02	.21	426	.090	1829.	.21	239 419
Alton	.08	38.41	.0038	1.9	.93	1.55	.479	.778	446.	1.79	193.330
Springfield	.14	24.32	.0073	1.2	1.04	3.46	.415	1.378	165.6	3.32	251 394
Decatur	.177	17.18	.0088	0.87	1.09	11.99	.466	5.106	98.8	10.93	234.851
Chicago	.454	26.21	.0227	1.31	1.46	1.35	.346	.310	57.8	.92	421 000

A—Appropriation. L—Loss.

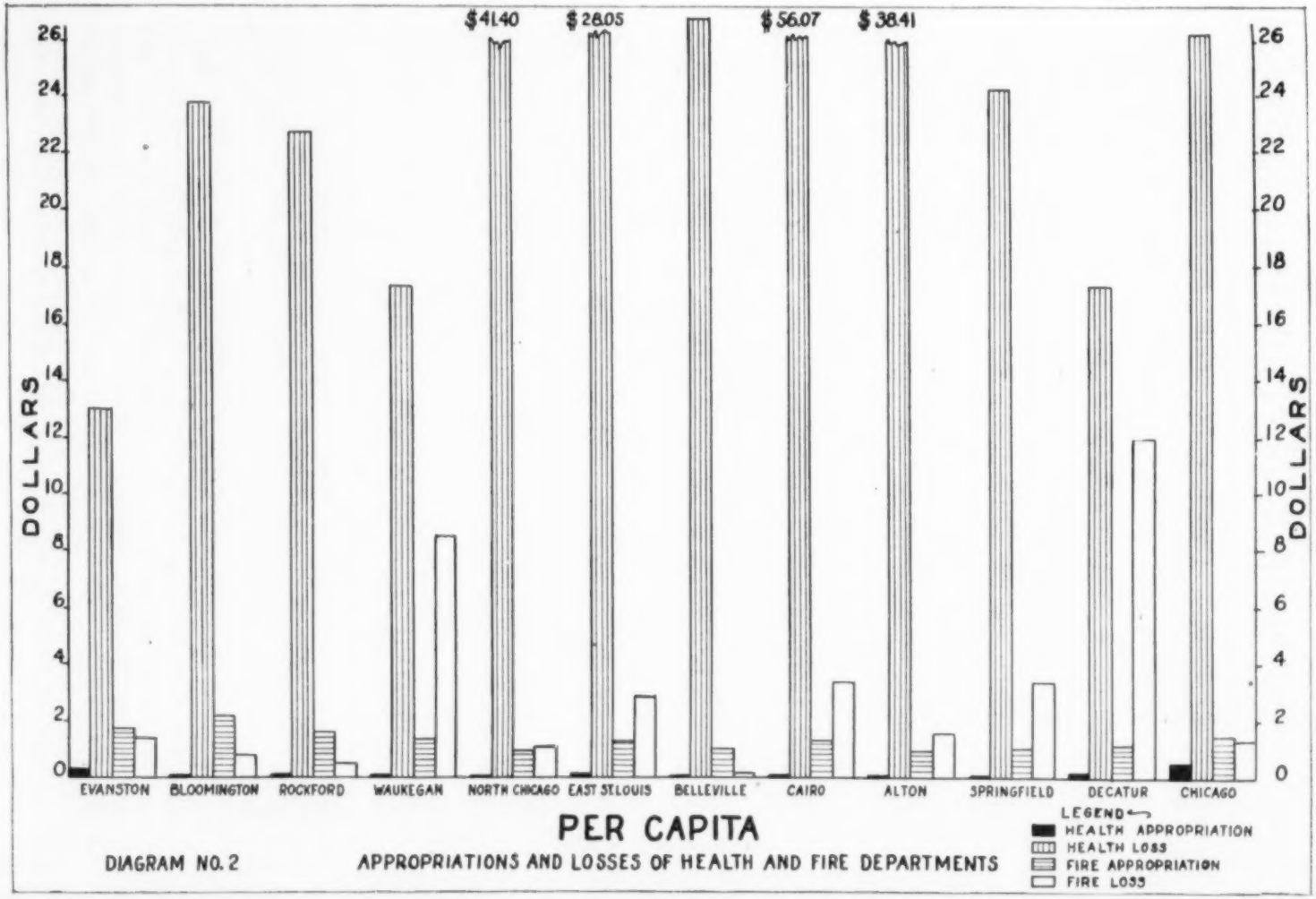

DIAGRAM NO. 2 APPROPRIATIONS AND LOSSES OF HEALTH AND FIRE DEPARTMENTS

work it is dealing with scores, hundreds, or even with thousands. Whether we consider the value of the risk involved or the losses that might result, treatment is like the retail business, and prevention is on a wholesale scale. It may, therefore, be questionable whether a department is justified in entering the competition in treatment of cases, except only so far as it may be necessary in order to prevent the spread of disease, especially so long as the governmental work of restriction of communicable disease is so imperfectly managed as at present.

□

POPULARIZING VITAL STATISTICS

C. ST. CLAIR DRAKE, M. D.,

Director, Illinois State Department of Public Health, Springfield, Illinois.

Read before Section on Vital Statistics, American Public Health Association, at New Orleans, La., October 29, 1919.

Fitting dry-as-dust vital statistics to the psychology of the people is one of the most important problems in modern popular health education. For the benefit of brother health officers Dr. Drake gives a few leaves out of his own experience in impressing fundamental statistical truths on a public that demands interesting presentation together with pictures and variety and novelty.

Vital statistics constitute our one means of accurately proving the necessity for and the success of our public health activities and of demonstrating the value of such activities to the public with mathematical precision. For the first purpose —for the guidance of health officers and technical workers — vital statistics, in their usual prosaic, tabular form may prove entirely satisfactory; but for the information of the people and for public demonstration the material contained in statistical reports must be redressed, interpreted into a new language and made readily intelligible. To transform the contents of statistical tables into interesting reading in a day when the public mind is over-occupied by varied activities and stirring events, requires a high degree of originality and ingenuity and yet, unless we can present our morbidity and mortality data in a form which will attract attention and carry conviction, we shall fall far short of our ideals and possibilities of accomplishment in public health work.

The two fundamental aims of the health official are the saving of human life and the prevention of unnecessary human illness. To accomplish these ends it is essential that there be provided reasonable financial appropriations, and it is necessary that there be created a very general popular interest in the maintenance of health.

In this age of specialization, when individual phases of health work are subject to enthusiastic over-accentuation, and in this day of almost hourly sensations and thrills, legislators are not influenced or impressed and the people are not aroused by glittering generalities. They demand something definite and tangible. They insist upon evidence rather than what they may regard as biased or prejudiced opinion. Language has been combed during the past few years for superlatives and extreme expressions and these

have been so constantly employed that they have lost their original force. Lawmakers and the public alike must be actually shown and it is the job of the successful health official to visualize convincingly and attractively the evidence which comes to him in a form which is dry and unappealing.

It has long been recognized that the average citizen, rich or poor, can appreciate the value of dollars and cents more clearly than that of human life or human efficiency and, on this account, a common method of popularization of vital statistics has come to be the expression of human wastage in terms of money. This is naturally capable of innumerable variations and applications.

The legislator who has been elected to office on the popular platform of public economy can be impressed by statistical information expressed in cash terms and showing big cash dividends accruing to the people of the state through the investment of public funds in certain definite phases of public health work. The average householder finds something of personal interest in a showing of the financial loss suffered by his own community through the maintenance or tolerance of definite insanitary conditions. An attractive display of the comparative cost of a funeral with the cost of typhoid vaccine may cause the busy citizen to give his first thought to this and other preventive agents.

But even when we have translated our deaths and births and illnesses into terms of money, we must seek some means of bringing the facts to the attention of the people—of visualizing them so that "he who runs may read." Some years ago, when it seemed particularly desirable to impress upon the people of Chicago the unnecessary wastage due to communicable diseases and when mere words, however expressive, seemed to arouse little attention, we employed the plan of measuring the cost of these diseases to the several city wards in silver dollars and illustrated the cost by pictures showing these piles of dollars as compared in height with the Masonic Temple, then the highest and best known building in the city. When it was shown that diphtheria, scarlet fever and measles, for a period of six months, had cost one city ward a stack of silver dollars over nine times as high as the twenty-story Masonic Temple, there was general surprise and very extensive discussion, while the comparative showing of the various wards created considerable comment and even some resentment on the part of the political and civic leaders in those wards which made the more unsatisfactory showing. Whatever the reaction, agreeable or disagreeable, commendatory, critical or resentful, the important thing was that a much larger percentage of the Chicago population was thinking of the value of health more definitely than it had been formerly.

Incidentally, the comparison of morbidity and mortality statistics, expressed either in numbers or in terms of money of several neighboring and competitive communities, has proven an excellent means of bringing public health to the attention of the people. While the citizens of Smithville may be quite indifferent to the fact that the city has an abnormally high death rate, they do not wish it pointed out that Jonesborough, its bitterest competitor for commercial and civic honors, makes claim to a much lower rate and, in virtue of this fact, is declared to be a better and safer place to live in.

After impressing upon the people with stacks of silver dollars the cost of communicable diseases and thereby arousing popular interest if not genuine concern, graphic charts were prepared showing the cost to the community of losses by fire and losses through lawlessness, proving definitely that community wastage through preventable disease is far greater than either. And then the stacks of silver dollars were brought into play to

indicate to the people the relative public expenditures for fire department, police department and health department. It is, of course, exceedingly difficult to measure the exact results of any form of publicity; but it has been demonstrated over and over that, if the essential facts of community vital statistics can be gotten to the people, more liberal appropriations for public health work almost invariably follow. If the people as a whole can be made to realize, even in a general way, that they have a definite interest in community health, the politician may be quickly made to see that the promotion of public health is a matter of good politics.

The public health official, who is compelled to go from time to time before finance or appropriation committees, is soon impressed that his case is tremendously strengthened if he can support his pleas with reliable statistical data; but he is also often impressed that two or three forceful charts or pictures hung on the committee room wall are more effective than the most elaborate verbal addresses or type-written arguments.

Even after obtaining liberal appropriations, the results of health activities will not be satisfactory unless it is possible to arouse popular interest and to convince the people as a whole of their own interest in health conservation. For this purpose, if judiciously handled, vital statistics are of inestimable value. For public consumption, however, statistical information must be administered in small doses and, if possible, must be given local application. The morbidity and mortality figures of a man's own home town will attract his attention when he would ignore the data of other communities or of the state as a whole and, as a rule, it is better to let the individual community meditate on its scarlet fever problem this week, its tuberculosis problem next week and its child welfare problem the week after, than to fire the whole shot at one time, to produce a ripple and then be forgotten. A relatively apathetic and uninterested people will not absorb large doses of public health instruction at one sitting, while constant repetition of the same essential facts delivered from different angles has been found effective in all lines of commercial advertising.

But the public requires variation and novelty. It must in some way have its curiosity aroused and must be attracted by the element of surprise. The lessons of vital statistics must at times be taught by devices that arrest the attention first and then impress the brief lesson upon the arrested attention. In visiting a county fair, the sightseer is attracted by the sounding of a gong which rings out with endless, monotonous repetition. His curiosity is excited and he asks what it means and is told that every time the gong sounds someone has died from tuberculosis in his state or in the nation. He is apt to question the accuracy of the statement. He may get the figures and try to disprove it. At any rate, he is thinking public health as he never would have thought it had not the incontestable evidence of vital statistics been beaten into his unwilling ears by the sounding of the gong.

That babies die and that a considerable number of them die is accepted as a matter of course by the average citizen. It has always been so and he gives the matter little thought. A mechanical device showing the figure of death hovering over a moving group of babies and cutting down every fourth child with a scythe, arrests his attention as he wanders from the stock pens to the race track at a state fair. He stops and watches it, his chief interest, perhaps, being in how the "contraption" works. Whatever the point of attraction, he is likely to move on thinking for the first time in his life of what unnecessary infant mortality actually means to his community.

It is obviously impossible at this time to refer even to the many ways in which the facts elicited from vital statistics are being brought to the people through the

ingenuity and originality of health officials; but however extensively this popularization of statistics has been developed in certain states or communities, it is safe to say that the possibilities of development have but been touched. Public health has ceased to be above the heads of the general public. If properly conveyed, the people are receptive of instruction; but they want proof rather than theory. Our best and most reliable source of evidence lies in our vital statistics and the health official who can master the art of actually popularizing his statistics will go far in the attainment of the greatest good.

THE MEETING IN SAN FRANCISCO.

The time for the Forty-eighth Annual Meeting of the American Public Health Association has been set at August 30 till September 3, 1920, and the place, San Francisco, Cal. To show to some extent the character of the city in which this great gathering of health officers and executives is to be held, this view of the City Hall is presented. It is the rallying point of a group of buildings forming a civic center, of which any American might feel proud, suggestive of municipal spirit of highest quality. The ornamented square in the foreground is surrounded by public structures of the same character as the City Hall, including the Public Library, and the Municipal Auditorium, in which the meetings will be held, with the plannings still calling for other structures. The meetings of the A. P. H. A. never have had more auspicious environment.

MOSQUITO WORK OF THE BUREAU OF ENTOMOLOGY

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Read before General Sessions, American Public Health Association, at New Orleans, La., October 29, 1919.

The early work of the Bureau of Entomology on mosquitoes was summarized in a publication of the Department in the summer of 1896.[1] The important features of this work were the demonstration of the practical use of kerosene oil in the destruction of mosquito larvae by Dr. Howard in 1894, and the complete life-history, with figures, of the common mosquito, *Culex pipiens*, based upon the original studies of Dr. Howard in the summer of 1895. The work of the Bureau up to this date dealt with the mosquitoes from the standpoint of the annoyance and the discomfort they cause. The theory that mosquitoes were possibly concerned in the transmission of malaria, presented forcibly by Dr. A. F. A. King in 1882[2], did not serve to justify more extended considerations. Dr. Howard in commenting at that time upon the views held by Dr. King, said "they may go so far as to initiate and encourage experiments and observations by which the truth or fallacy of the views held may be demonstrated."

The demonstration by Ross in 1897, which was inspired by the discovery of Laveran (1880) and the ideas of Manson (1894), gave to the subject of mosquitoes and their repression a vital interest and fastened the attention of the medical world upon this group of insects. It became necessary to have full details concerning those which had been incriminated in carrying the disease and information that would enable the sanitarian to distinguish the disease-conveying species from those that are harmless in this respect. In 1900 Dr. Howard published an account of the life-history of *Anopheles quadrimaculatus* which permitted recognition of the mosquito in all stages of its development, a point he recognized as important in any control effort.[3] The biology of this malaria mosquito was given in comparison to that of the common domestic mosquito, *Culex pipiens*. This publication was followed by an official bulletin,[4] published the same year, which gave a general account of the mosquitoes of the United States and the known facts of their biology, special attention being devoted to the American species of Anopheles and their geographical distribution. The following year the same author published a volume on mosquitoes,[5] which also attracted wide attention. This little book at once became the "bible" of all interested in mosquito warfare. The writer speaks from experience as during that year he began his first mosquito work in the Hawaiian Islands. The universal interest and value of these early publications can hardly be appreciated at this late day when the details of mosquito development are so well known. But it is not out of place to discuss them thus briefly when we consider that they constituted the basis of mosquito control effort in this country.

Up to 1901 some 25 species of mosquitoes only were recognized among those occurring in the United States. It became apparent to Dr. Howard that all species must be studied carefully as to distribution, biology and sanitary significance in, particularly, the regions included in North and Central America and the West Indies. This work was undertaken in the early part of 1903 and was made possible by a grant from the Carnegie Institution of Washington. The grant covered a period of three years, but at the

expiration of this period the project was far from complete and many regions remained unexplored. The work was continued during 1906, 1907 and 1908 partly by funds appropriated by Congress for the study of insects affecting the health of man and domestic animals, partly by the help of the Isthmian Canal Commission, partly by the help of volunteer observers in the West Indies and Central America and partly at the expense of the men associated with Dr. Howard in the work—Dr. H. G. Dyar and Mr. F. Knab. The result of this work has been published in four volumes,[6] the first volume appearing in 1912 and the last in 1917. How well the authors succeeded in their undertaking can be judged by this publication, which stands as a monument to their fifteen years of endeavor.

Subsequent to the early work of the Bureau on mosquitoes and prior to the appearance of the monograph above mentioned, results of economic significance were published, a review of which is not permitted by the time limit of this paper or indicated by the purposes of this meeting.[7]

In the summer of 1913 a project was undertaken by the Bureau to deal especially with the mosquitoes concerned in the transmission of malaria in this country. A laboratory for the purposes of this investigation was established in the delta region of the Mississippi valley at Mound, Louisiana, where the Anopheles mosquitoes and malaria, are prevalent.

One result of this project has been given in the conclusions on the loss in crop returns from malaria.[8] The loss occurs in the time and the reduced efficiency of the plantation labor during the crop seasons. As the negro tenant performs the greater part of the agricultural labor in the delta region, the important point in the prevention of malaria in this region is the control of the disease among the tenant class.

It was determined that the amount lost in crop returns is equivalent to a direct annual tax of $3.88 per acre upon the land under cultivation. It is estimated that the average cost of primary drainage of swamp lands, which are permanently wet and never fit for cultivation even during most favorable years, is $4 per acre in any project that involves a large territory; for secondary drains, to place the land in productive condition, an additional amount of $8 is required; and for bringing the land into cultivation a further expenditure of $5 an acre is necessary. This is a total average cost of $17 per acre to bring permanent swamp land into cultivation.[9] The tax of malaria on the land under cultivation is sufficient to pay in less than five years the cost of bringing an equal number of acres of permanent swamp land into cultivation.

Four species of Anopheles have been encountered in the work in progress in the delta. These are *A. quadrimaculatus, A. punctipennis, A. crucians* and *A. pseudopunctipennis.* One of these species, *A. punctipennis,* heretofore considered a mosquito which did not convey malaria, was incriminated as an efficient host by Dr. W. V. King of this Bureau.[10] The rearing of the mosquito material for this and subsequent demonstrations of Dr. King[11] was done at the Mound laboratory and the experimental work with the same accomplished by him in the laboratories of Clinical Medicine of the School of Medicine of Tulane University together with Dr. C. C. Bass and Dr. F. M. Johns.

The ability of a species of Anopheles to act as the agent in the transmission of malaria depends not only upon its efficiency as a host of the malaria parasites, but also upon its numbers in any region, its seasonal appearance, and the extent to which it enters dwellings to feed or is successful in finding human blood elsewhere where malaria occurs. To determine the species of Anopheles concerned in the transmission of malaria in any region, their numbers, their sources, their habits and the environ-

mental conditions in that particular region must be studied. An important carrier of the disease in one region may be of comparative little importance or of no concern in another region under varying factors of season, breeding places, shelters and class of people concerned.

The species of Anopheles that occur in the delta have been associated with the types of the malaria parasites found in that locality. The important carrier of malaria in the delta region is *A. quadrimaculatus*. The species is thoroughly adapted to the environment of the swamp country. It is by far the more common Anopheles and the one encountered in numbers throughout the season in and about habitations. The prevailing type of malaria parasite is estivo-autumnal.

It has been determined that the capacity of certain classes of artificial collections of water is very limited in the production of Anopheles. These domestic breeding places do not contribute sufficient Anopheles for the purposes of malaria transmission. This point of source of Anopheles is of special interest to the sanitarian engaged in malaria mosquito control. The larvae of Anopheles are found in water barrels, in troughs used for stock, in disused cisterns, and in other artificial collections of water about habitations. Careful observations with adult emergence tests from these sources have been made. At most the emergence was very small and in some instances negative from containers that had been stocked with larvæ in some numbers. The typical sources were found to be the margins of bayous, swamps and shallow lakes; woodland pools; water shallow enough to support aquatic vegetation other than at margin; and open water with logs, stumps or brush, or with the surface covered with trash, debris or floating vegetation.

The idea prevails that Anopheles mosquitoes do not bite in the daytime, that malaria infection is obtained only after nightfall. If this were true it would be difficult to explain many infections that are contracted. It has been found that while these mosquitoes are more active just at dusk and afterwards, they will bite any time of the day a blood meal is required and the opportunity to obtain same is offered. This is particularly true of those in dwellings where the occupants are sheltered during the night by mosquito-bars and in offices or other places of business that are vacated during the night. These mosquitoes when trapped within a screened house become very persistent in seeking a blood meal day or night.

The screening of dwellings has been an important factor in the reduction of malaria when the screening work has been done thoroughly and proper use has been made of the protection afforded. Imperfect screening will defeat its own ends by the trapping of the mosquitoes within the dwelling and the improper use of a perfectly screened dwelling will give the same result. Dr. Howard estimates that the people of the United States spend $10,000,000 every year for screening against flies and mosquitoes and concludes that if this enormous expense is at all necessary, it should be done thoroughly.[12] There is a distinction between screening to obtain comfort and screening for protection against disease transmission. After the screening has been thoroughly done, the proper use of the screened dwelling implies care that the doors do not offer entrance to mosquitoes through carelessness in leaving them open, or in entering and leaving the house, in replacing or repairing screening where it has been damaged or is worn out, in not leaving unsuspected openings unprotected, in making certain that the construction of the building is mosquito tight, and in searching for and destroying all the mosquitoes that do find entrance despite all possible precautions. Constant care and watchfulness on the part of all members of the household are required. Without any doubt screening is an efficient protection against malaria

infection among an intelligent class of people. The question of how much dependence can be placed upon screening among the negro tenant class on a plantation is one open for discussion. In the first place the usual construction of the tenant houses does not lend itself to effective screening. The open construction of the floors and walls, the irregular construction of the door and window casings, the absence of a ceiling in some instances, and the use of the fireplace for cooking during the summer months (preventing the covering of the chimney flues) would demand the reconstruction of the tenant houses on the average plantation in the delta and the substitution of cooking stoves for fireplaces. Ventilation must be considered in such a change among the tenants. The open construction offers an amount of ventilation that would otherwise be denied because of their aversion to the night air. Admitting that the reconstruction is practical, it is open to question whether or not the tenant class would properly use the protection offered and, even if the screening remained intact, the extent to which this class would remain at home after nightfall to take advantage of the protection. We can reconstruct houses, but how far can we go in reconstruction of habits and impulses that are characteristics of the class under consideration?

The individual use of the mosquito bar over beds is a more promising protection against malaria infection than screening the house among the tenants. One careless member in a household will offset the care taken by all other members in a screened house, but the mosquito bar protects the individual. The mosquito bar also implies no reconstruction of buildings, and places no restrictions upon the movement of individuals from point to point.

As applied to a plantation the methods to be employed in the prevention of malaria cannot count to any great extent upon the control of the tenant class under present conditions. Lacking control of the human host, with the difficulties that confront screening, with large tracts of permanent swamp having no outlet, and with expenditures for protection limited by the profits on the crops grown, the prevention of malaria on the plantations in the delta offers a problem in the solution of which the usual suggestions do not apply. The investigation of the Bureau aims to assist in solving the problem in so far as the measures directed against the mosquitoes are involved.

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DRAINAGE AS AN ANTI-MALARIA MEASURE

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Read before General Sessions, American Public Health Association, at New Orleans, La., October 29 1919

This author argues the necessity of liberal interpretation of laws. The Health Officer can then be able to use prevention at malarial sources beyond his borders. He urges co-operation of the health officer in drainage plannings and suggests value of permanent improvements, following, of course, study of local conditions.

MANY states have drainage laws which enable large tracts of land to be so drained as to fit them for agricultural development. Such drainage laws are effective in many states in the so-called "malaria belt." When these laws were written, little was known of the difference between land or farm drainage and what is now called "Anopheles drainage." The laws as written plan for the partial removal of present standing water or more rapid removal of storm water, and to some extent the lowering of the sub-surface water level in the areas involved. Up to the present time the state health officers have not even been consulted in connection with country drainage projects, and consequently malaria prevails in areas which are said to be properly drained.

Every drainage project of county or township should be required by law to have the written approval of the state health officer. Also, the laws should be so amended as to include and require the installation of such auxiliary or lateral drains as the state health officer finds essential—and a certain sum or percentage of the cost of the project should be set aside by law for the installation of such minor drainage as is essential for prevention of malaria and also for maintaining the ditches of the general drainage scheme in such condition that they will not become a real menace to health. At the present time in many instances the main drains are neglected until they are silted up, overgrown and obstructed so that the loss in value to the adjacent lands is far greater than the cost of proper and efficient maintenance. In addition, such conditions are too frequently accompanied by lowered vitality among the rural population and a subnormal property value.

The main lines of the drainage systems, and many of the larger branch lines, frequently become matted with vegetation, and those species of fish which prefer mosquito larvæ to other food are prevented from destroying the Anopheles wiggle-tails. This condition can frequently be remedied by having a channel of smaller cross-section within the bed of the ditch to give a greater depth of water, and clean-cut edges, free from vegetation at the water surface during periods of minimum flow, which often corresponds to the season of maximum production of malaria-bearing mosquitoes.

The recent advance in cost of farm lands will undoubtedly result in increasing reclamation projects of swamp lands. Companies attempting to colonize such areas must remember that the drainage of a dike enclosed or other area will not

keep the people living within a quarter of a mile to a mile from the boundary line free from malaria nor the mosquito pest. Mosquitoes produced on adjacent lands will probably travel toward the drained farm colony. A zone of drainage protection around habitations is essential.

In planning Anopheles drainage schemes for towns, we must remember that frequently in small towns and also in the suburbs of large ones we have the highest malaria rate and maximum Anopheles production. It is necessary, therefore, that state health officers in revising sanitary procedure arrange for the authority and jurisdiction of the town health officer to extend a safe limit beyond the so-called town lines, and the city health officer should be given authority to spend city funds in such a manner as will produce a maximum of good health among town people for a minimum of expense. If a city or town health officer can keep more town people well per dollar expended by doing sanitary drainage work one inch or one-quarter of a mile beyond the town limit than he could by spending two dollars on less important work within the town limits, there is no sane reason why he should not be authorized to do it. The mere fact that it has not been done before merely indicates that the public has not been properly informed that the taxes are, relatively speaking, being wasted.

FARM DRAINAGE VERSUS ANOPHELES DRAINAGE

The farmer in draining his land has two objects in view: to lower the subsurface water table sufficiently to allow crops to grow to best advantage and to carry off storm water. On some farms part of the land is in pasture and little attention is given to wet areas on pasture lands. The latter frequently cost the farmer a heavy annual malaria tax.

It is frequently stated that it is out of the question to consider the drainage of rural areas for malaria-control purposes, as the cost would be prohibitive. In some areas this statement may be true, but the writer refuses to accept the statement as generally true. He is convinced that there are highly malarial areas containing hundreds of square miles that it will be more economical to drain than to leave in their present condition. Before the recent war, when farm wages were normal, a thorough investigation, under the direction of Capt. D. L. VanDine, of a large, well-managed plantation in Louisiana showed that the cost of malaria (malaria tax) per acre per year was approximately three dollars and eighty cents ($3.80) per acre. During the war, and in connection with the protection of the army and naval forces and industries concerned with war supplies, 1,300 square miles were drained and kept practically free of Anopheles at a cost of $1.61 per acre for a year. Figures will soon be available to show the cost of maintenance work in those communities which have continued practically free from malaria. During the war period, near war industries and cantonments, laborers' wages were higher than in any previous period in history, and yet we find a cost of $1.61 to be free of malaria, as against $3.80 to pay for the privilege of having malaria.

Recent inquiries in another state in a highly malarious agricultural district indicate a direct loss from malaria to the farm tenants and owners of more than $10 per acre during 1918.

The farmer arranges his drains, as stated, to carry off storm water, and cares little as to their condition after the storm water has gone by. It is then, from the sanitarian's viewpoint, that the ditch is most dangerous and most important. As a rule, the cross-section of the bottom portion of the farm drainage ditch, storm water ditch, or stream, is unsatisfactory for "Anopheles drainage"

because it is such that it does not become dry or produce a maximum velocity at times of normal or at times of minimum flow, and because its ragged edges produce places where the water has no velocity and where the mosquito larvæ can find protection from their natural enemies.

SUBSURFACE DRAINS OR TILE DRAINAGE

Although tile drainage has been used for many years in improving farm soils and increasing productivity of farm lands, health officers have given but little thought to this subject and have failed to co-operate with the state and Federal agricultural agents in their efforts to make tile drainage more popular. The particular advantages of tile drainage are that it often enables us to permanently eliminate malaria mosquito production areas and improve the agricultural value of farm lands in one operation at a reasonable cost. It is safe to state that the agricultural value of farm lands so treated will increase, and frequently the increased productivity will represent a much larger dividend than could be obtained by investing a similar amount of capital in safe mortgages.

It should be stated that tile drainage schemes should be properly planned and installed by experienced persons, and that tile drainage systems can be and have been incorrectly located, and consequently have failed to accomplish expected results.

PRESENT METHODS OF ANOPHELES DRAINAGE AND ANOPHELES CONTROL

Rapid strides are being made in sanitation today, and it is to be hoped that within a few years communities desirous of freedom from malaria and the mosquito pest will issue bonds that will furnish sufficient capital to install adequate permanent drainage systems, to maintain which will cost but a very small fraction of the original cost. Some towns and counties have already taken such action.

Where conditions are favorable, the writer believes in so planning the drainage system as to eliminate the necessity of supplementary measures, such as oiling and maintenance of open ditches. He carried out experimental investigations along this line on the Isthmus of Panama and thereby largely reduced the cost of malaria control.

Until such time as the public is sufficiently interested in malaria control to take the steps above mentioned, it is advisable to carry out the present system of procedure. This consists of draining useless ponds, swamps, and wet lands with open ditches, and where necessary, intercepting ditches. As a rule, engineers, as well as other people, make the bottoms of ditches unnecessarily wide, and this fault increases mosquito-producing capacity of the ditch because it decreases the velocity of flow of water, decreases depth of water in the ditch, and favors clogging of the ditch with vegetable growth. The latter furnishes a secure hiding place for mosquito larvæ and also protects them from those species of fish that destroy all mosquito larvæ if given half a chance.

Open ditches installed for mosquito control purposes should, so far as possible, have clean-cut sloping edges, narrow bottoms and courses as straight as practicable.

Streams should, where practicable, have steep banks from directly above the normal flow line to below the dry season low water line, and be freed from vegetation, sticks, stones, and obstructions that interfere with the current. It is not necessary to remove all brush from both banks of a stream, and is generally advisable to clear one bank and only as much of the vegetation from the other as does, or will, hang into the water.

The objectionable feature of the present method of procedure is the question and expense of maintenance and oiling. Where the annual cost of this maintenance work is greater than the interest on the cost of light reinforced concrete

lining of the ditches with intercepting key walls or greater than tile drainage, then unquestionably one of the latter should be used. The problem is one for the health officer to consider. If his town will consent only to temporary measures, of smaller initial outlay, he is forced to follow that procedure. However, in many cases, with sufficient expenditure of effort, he can probably get a small appropriation for the installation of a sample (say 100 yards) of some permanent ditch-lining work and locate same at a point of maximum traffic where it will be seen by everybody and thus induce the town people to see the wisdom and economy of carrying out the extension of the permanent system. Undoubtedly years ago the people were against the installation of sewers much more than they would now object to being taxed for permanent malarial control measures, and yet the sanitarians that preceded us changed the public viewpoint just as it is now our privilege and duty to do so, so far as malaria control in growing towns and suburbs of cities is concerned. If the health officer is at first not successful in his efforts of persuasion, he can, if he wishes, have a sample section of ditch lined by obtaining funds by subscription and then keeping record of cost of maintenance and oiling in open earth ditches per mile per year as compared with cost of maintenance of permanent ditching.

While sanitary improvements cost money, it is always well to make a study of the local problem and determine whether or not the lack of sanitary improvements is not far more expensive.

Dr. L. O. Howard, the father of the mosquito extermination campaigns in this country, estimated some time ago that the malaria mosquito alone cost citizens of America $100,000,000 per year. Since that time many new towns and villages have been built and tons and tons of mosquito wire have been purchased and have been ineffectively installed and decayed.

If a portion of the money expended had been used for permanent drainage construction, many of our malarial suburbs of towns would be practically mosquito-free and hundreds of persons who died as a result of malaria fever would be alive today.

The writer knows that in many localities effective screening of houses is the best preliminary procedure for malaria control, but has visited numerous villages and towns where thousands of dollars are being spent each year for expensive screening, most of which is ineffectively installed, and where it would have been more economical and satisfactory to have installed permanent drainage systems and obtained permanent benefits at a reasonable cost.

San Francisco, August 30-September 3, 1920.
For the Forty-eighth Annual Meeting of the A. P. H. A.
Today Is Not Too Early to Be Making Your Plans.

SANITATION IN SERBIA

EDWARD STUART,

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We must maintain health programs in Serbia according to Major Stuart, who tells plainly of conditions as his party found them. Serbia, with other Balkan countries, is a menace to the health of the Western world. Typhus and malaria are endemic, while tuberculosis and other communicable diseases enfeeble the people.

The Great War now being over, it may be well, at this time, to record something of the history of disease in the Balkans during the past five years. The enormous amount of suffering throughout Europe has been so extensive that one focus of epidemics sinks into relative insignificance; but the intensity of sickness and misery which has existed in that region has made the Balkans almost a synonym of death, starvation, and disease.

There have always been epidemics in the Balkans. The history of their wars runs hand in hand with the history of their epidemics, and the latter are bound to continue unless radical changes can be made. Sanitation, health organizations, and the hygiene of the person are so bad that nearly all the diseases considered by us as preventable, stalk about unhindered, uncontrolled; and even diseases ordinarily found only in the tropics occur, such as pappataci fever, dhobie itch, and a malaria which is tropical in its perniciousness.

The abdominal infections, typhoid, cholera, and dysentery have been very common, and outbreaks of these have followed one another in sudden and terrific attacks which have taken their toll in thousands of lives in many towns, sometimes a third of the population of the community at one time, and among the armies which have waged so many wars against one another. Such mortality seems exaggerated from our point of view in the United States, but when one realizes the condition of the water supplies, taking an example, it is not surprising. The writer has seen towns in which all the night soil of the household is collected in buckets and thrown out upon the surface of the cobbled street in front of the house, to be washed by the first rain to the next corner, where there may be a collecting basin for the water supply of the neighborhood. The collecting basin, protected by a few loose pieces of sheet iron, receives a large portion of the surface drainage, which then passes through small pipes directly to the fountains from which the population take all their water.

A few of the cities in northern Serbia, situated in the valleys of the Save and the Danube, have artesian supplies, but nine tenths of all the supplies are exceedingly dangerous to drink. The city of Belgrade has the only sewer in all Serbia; all other towns, institutions, barracks, and hospitals accumulate their wastes in large putrescent pools, or permit the wastes to shift for themselves.

The insect-borne diseases are the best-known scourges, of which typhus fever is pre-eminent. It is endemic throughout the Balkans, parts of Hungary, and, extending up through Galicia, reaches Po-

land and the Baltic Provinces. Malaria, very serious in southern Serbia, is endemic in Macedonia and parts of Albania. In fact, it is so serious in these regions that the whole population has deteriorated to a very low state of efficiency. Hundreds of square miles of marshland along the valley of the Vardar, north of Saloniki and along the Adriatic coast, near Durazzo, breed the mosquitoes which spread the disease. The European type of relapsing fever is extremely common throughout the Balkans, and occurs during both hot and cold seasons, in this respect unlike the typhus, which usually dies out during the summer. Pappataci fever has already been mentioned, and it occurs along the stretches of the rivers haunted by the moth midge, *Phlebotomus papatassii*, which can pass through the finest mosquito nets.

Of other diseases, the most common are tuberculosis, its prevalence being largely due to the low standard of living, the venereal diseases, pneumonia, and skin and eye diseases everywhere.

The War

When Austria declared war on Serbia in the summer of 1914, her armies seized a certain portion of the Serbian territory. The Serb army promptly drove them out. Later, in December of that year, Austria, with an army of 600,000, again invaded the country, descending about a hundred miles into Serbia; and was again forced back by a Serb army, half the size of the other, to her territory north of the Danube and Save rivers; the Serbs capturing 60,000 prisoners, among whom were some already infected with typhus. These prisoners crowded into rough barracks and camps with no facilities for any sort of cleanliness, sleeping on the floors, huddled together for mutual warmth, soon became victims of the disease which spread rapidly as the vermin increased, until ultimately practically every prisoner became infected. Moreover, as the prisoners were continually being broken up into smaller groups and shifted about from one part of the country to another in close proximity to the Serbian soldiers themselves, the infection soon spread into the Serbian army and into the military hospitals where the sick prisoners had been brought, no adequate isolation having been attempted.

From the army the disease traveled to the civilian population, until the whole country was in a conflagration of typhus. Vital statistics being non-existant, it is impossible to know how many were stricken, but it can be stated with reasonable certainty that approximately one quarter of a million people became ill with typhus in Serbia between December, 1914, and July, 1915. It was a very virulent type, with a high mortality, fatal to 50 per cent of the Austro-Hungarian prisoners, it is known. The mortality among the Serbians is unknown and the estimates are very varied; but, personally, I am inclined to believe that a conservative estimate would place the number at about 85,000, including the 30,000 prisoners who died. With a total population in Serbia of 4,000,000, this makes a mortality of 2,125 per 100,000 in six months! Such a mortality among a population as large as that of the United States would mean over two million deaths.

The conditions in the country at that time beggar description. At war against a great enemy, a primitive civilization (half the country had been freed from the Turks only two years before; the other half, excluding a small section, only 40 years before), inadequate hospitals, supplies, medicines, and but 300 doctors in all, of whom 125 perished in the epidemic; it is difficult to conceive of more misery. But it was the fate of this country to learn more horror later.

At the call of diplomatic and consular representatives, many Allied and neutral missions were sent to aid in combatting the epidemic. The Russian Government sent the personnel and supplies for several complete typhus hospitals; France, one hundred military doctors; England, a military commission under Colonel Hunter, R. A. M. C., and a large number of field and base hospital units; America, several Red Cross hospital units and a sanitary commission supported by the American Red Cross and Rockefeller Foundation jointly, under the direction of Dr. Richard P. Strong of Harvard; and even small nations such as Belgium and Holland furnished doctors and nurses. An international committee was formed of the heads of the larger missions, together with the representatives of the Serbian army and civil sanitary administration, the country divided into sanitary zones, and the latter assigned to various missions in accordance with their kind of personnel and equipment.

Concentrated efforts were applied at those points where the epidemic was most severe. It was considered that the most practicable method of killing lice in clothing and blankets was with steam. For this large refrigerator cars of the railroad were transformed into improvised sterilizers, in which, although the pressure was nil, the vermin were killed by the heat, the clothing having been hung up very loosely to allow easy access by the steam. Many large portable autoclaves were employed; and where these were not available the simple "Serbian barrel" (a device in which the clothing is supported over a vat of boiling water), was erected in large quantities. Haircutting, bathing, kerosene baths, and the fumigation of barracks and other buildings with large quantities

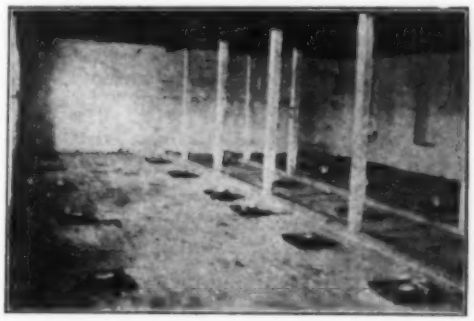
THE BREAD LINE IN BELGRADE (1916)

It was among these unfortunates that the mortality from tuberculosis assumed enormous proportions.

of sulphur were, principally, a matter of organization; but to efficiently organize such work for groups of troops continually being shifted from one part of the country to another, and where it is necessary to require various authorities to properly exercise their functions when they personally happen to see no necessity for it, and where the above mentioned processes must be carried out in the right sequence, it is difficult and, very often, impossible.

Delousing of cloth-stuffs by dry heat was found to be very impracticable on account of the damage caused by the ensuing destruction of the strength of the fibres. In the fumigation of buildings which had been badly constructed and therefore porous, sometimes as much as ten pounds of sulphur per 1,000 cubic feet were used with fairly good success. One problem remains unsolved, that is, the delousing of large fur coats. Many a fur coat was accidentally put into the autoclaves, and brought out about a square foot in size. Shoes can be successfully dipped into kerosene.

It may be well here to make a slight digression by mentioning a few precautions which experience has shown should be taken by small parties and individuals traveling in the Balkans during outbreaks of typhus. It is highly advisable to have the hair of the head clipped as short as possible. I have not found it necessary to cut the hair of the body and the pubes, because the louse which has made its way as far as the body will bite anyway and then find its home in the clothing; moreover, one is not apt to become infected on toilet seats because the "Turkish closet," where one squats over a hole, is almost universal. It is also a great personal discomfort. It is necessary to bathe, and change and wash the underclothing very frequently; to carry at all times one's own bedding-roll and folding cot and use them exclusively of all other beds; to avoid touching people as much as possible; to carry a rubber bath tub in the bedding roll; and if once infested with lice to find the nearest steam disinfector, which probably can be found at the nearest hospital. We have not found the use of powders or



Fumigating barracks with sulphur. 350 men slept in this room on the floor.

insecticides of any great value, but I would not go so far as to say they are of no use, as they can be used with good effect particularly against bedbugs. In regard to lice I can see no value in the use of silk underclothing.

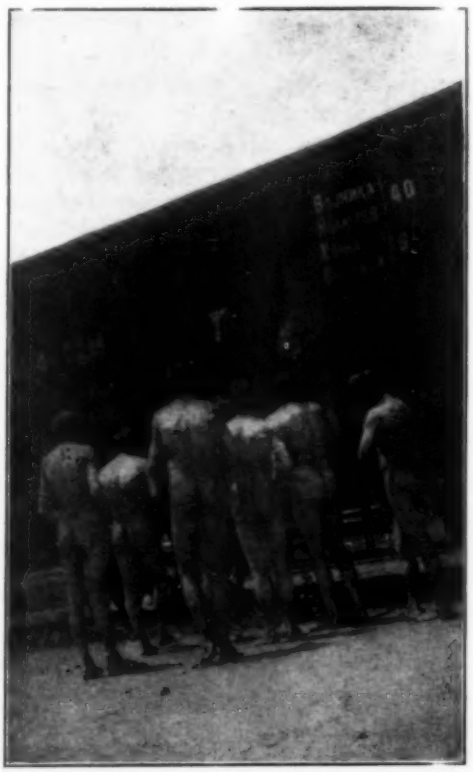
The epidemic of 1915 was so widespread, and the sanitarians so few, comparatively, in numbers, that the good results of the work would have been limited to only a few large towns, had it not been for the advent of the warm weather, which is the greatest enemy of the louse, for the people wear less, bathe more, and do not group together in small rooms. Typhus can be easily checked by proper organization when it is limited to a few definite foci; but when widespread over an entire country, with a more or less ignorant and primitive civilization, only a personnel which has the proportions of an army, and with unlimited supplies, can check alone a pandemic of this disease.

In July, 1915, the epidemic was officially declared over, and the country settled into a condition of rest and recuperation, as fortunately the front along the Save and Danube rivers was inactive

through the winter, spring and summer of 1915. Other diseases had appeared among the troops, such as typhoid, cholera, and relapsing fever. Dr. Aldo Castellani, the eminent specialist in tropical medicine, attached to the American Red Cross Sanitary Commission at that time, prepared a "tetravaccine" against the two former diseases and the two paratyphoids with which the whole Serbian army and all the remaining prisoners of war were vaccinated with success.

In October of that year the great combined offensive of the Germans, Austro-Hungarians and Bulgars was launched, and the whole country plunged into another turmoil. After a few weeks of fighting and continual retreating, practically the whole Serbian army and several hundred thousand civilians (refugees) were concentrated in one valley, where Albania, Montenegro and Serbia join. The food supply gave out, all automobiles and other vehicles obliged to be destroyed because the roads ended at this point and it was not desirable to have them fall into the hands of the enemy; and the army, twenty thousand prisoners of war, many thousands of young recruits in an unorganized mass, and a few thousand of the hardier refugees began their slow agonizing progress through the snow-covered, roadless mountains of Albania towards the Adriatic. The horrors of that terrible journey in which many thousands succumbed to cold, hunger and fatigue has been described many times by able pens.

As the survivors of the retreat straggled into the ports on the Adriatic, they were conveyed in small groups to the island of Corfu, where after a period of rest and inactivity the reorganization of the army was begun. The men were, however, in a very weak and debilitated condition and recovered their health but slowly, their recovery being retarded by an epidemic of cholera, which still further thinned their ranks. Six months later, this army was transported to Saloniki where it was made part of the Allied army under General Sarrail (later under General Franchet d'Esperey), and given a sector of that front near Monastir, where it remained for over two years until September, 1918, when there was started the victorious offensive against the Bulgarian army.



Serbian soldiers about to be sprayed with kerosene. Note the physique of these men. The palatial railway car has space for 6 horses or 40 men.

On the whole, that is to say, for all the diseases with the exception of malaria, the health of the army remained in fair condition, and the same may be said of the armies of the other Allies on that front, largely because sanitary facilities such as hospitals, disinfectors, and well-drilling apparatus were available from England and France. Malaria is endemic in the valleys of the rivers of southern Macedonia, and the uninfected

blood of the allied armies proved to be fertile soil for the disease. They found it as great a foe to combat as the enemy himself, whereas the enemy had the advantage of holding superior positions among the hills where there was much less breeding ground for the mosquitoes. English, French, Italians, Russians, Greeks, and Serbs suffered alike; hundreds of men stricken down in every battalion; and in a number of cases one or two officers and a few men only being left of a full battalion. One British battalion was reduced to one officer and 19 men. Hospital admissions for malaria totaled as high as 75,000 in 1916, and approximately 200,000 in 1917 and 1918 for all the Allies on that front, out of a total force which varied between 600,000 and 900,000 in number. The British hospital admissions alone were 30,000, 63,000, and 67,000 for those three years.

Traveling autoclave for stenming infested blankets.

Preventive measures of all kinds were taken; quinine, ditching, draining, oiling, cutting and burning brushwood, and personal protection by mosquito-proof huts, nets, gloves, and ointments; but the war required many of the above precautions to be discarded for the more pressing business of fighting, so that malaria proved to be very difficult if not impossible to stop. Moreover, the marshy region covers such a large area that drainage operations on a much larger scale than any attempted would have to be initiated.

The many thousands who had to be invalided home on account of malaria proved a very serious blow to the allied cause; but even now, with practically nothing of the army left, the problem remains with the inhabitants of the region keeping them in both a very low state of health and, indirectly, mentality. It is also a menace to travelers passing through Saloniki on their way to the north.

In the meantime, from the autumn of 1915 until the armistice, the Austro-Hungarian army was in control of northern Serbia as far south as Mitrovitsa, and the Bulgars were in possession of southern Serbia; and their respective sanitary organizations, corresponding to our medical corps, took charge of all hospitals, dispensaries, and preventive measures. The Bulgarian military doctors, practically all educated in Paris, Berlin or Vienna, were fairly numerous, for a Balkan state, but were in great fear of another large epidemic of typhus. They, therefore, secured the assistance of a number of German and Austrian doctors to organize against the disease, and Drs. Baehr and Plotz of New York, who had remained in the Lady Paget hospital at Uskub when that hospital was captured by the Bulgars, were given the opportunity of testing out the vaccine which they had prepared from the Plotz bacillus by vaccinating a large portion of the Bulgarian army. Although there were a good many cases of the disease scattered over Macedonia, there was no serious epidemic, as nearly as one may judge from the verbal reports which came from that region. All Bulgarian records of the period have so far been unavailable; but we realize that disease conditions must have been very bad indeed, in a country where the normal condition is serious, and where during the occupation the civil population suffered so many privations inflicted upon them by the army of occupation and were

obliged to get along with practically no medical attention whatsoever.

In northern Serbia, however, the Sanitary Department had a numerous personnel and was well equipped. Military and civil hospitals were organized at the important centers; delousing stations were set up both for troops and civilians; laboratories installed; and sanitary regulations issued and enforced. The Serbian doctors who had been captured by the Austrians during the advance, were employed in the civilian hospitals and dispensaries, and all municipal authorities were obliged to keep the cities and towns clean.

During the winter of 1915-16, several small epidemics of typhus broke out in Mitrovitsa, Tchatchak and Uzice, the first totaling only 160 cases; but adequate measures to prevent further numbers were promptly taken, and these epidemics died out, as was also the case in many other towns where the disease appeared. The following winter, so strict were the regulations and the control of traffic between the districts into which the country was divided, that there were only sporadic cases here and there. As an example of the typhus-prevention methods, it was interesting to see the transportation of 200,000 Turkish soldiers in 1916 from Turkey to Galicia, every one of whom was obliged to be thoroughly bathed and deloused before crossing the Danube into Hungary. All suspected cases of typhus were held in quarantine, and thus a number of cases sent back to Constantinople.

The Austrians had their greatest success against typhus. Measures were taken against the intestinal diseases and the numbers of cases were kept within reasonable limits so that there were no epidemics; but no striking reduction as in the case of typhus. Smallpox was reduced from 150 cases the first year to 60 cases the second year; malaria increased to some extent, and scarlet fever and diphtheria were reduced. A great deal of attention was paid to the venereal diseases by the supervision and regular examination of prostitutes, the control and licensing of houses of prostitution, and medical prophylaxis; supplemented by venereal clinics and hospitals for venereal diseases only. But the statistics of the Austrians show an increase in these diseases during the occupation, which is another point of evidence against the methods of venereal disease control which we have rejected in the United States.

A battery of bath-tubs. Austrian prisoners enjoying the first bath in many months.

Efficient as the sanitary organization may have been, it could not prevent the Austro-Hungarian Government's policy of exporting large quantities of food out of Serbia throughout the period of occupation, thereby reducing the people to various conditions of starvation, which was especially acute in Belgrade and some of the other cities. Many were reduced to absolutely nothing and died of veritable starvation, but the majority were able to obtain something, although entirely insufficient, and as a result the tuberculosis mortality began to assume large proportions. There has always been a high mortality in Serbia due to the unhygienic conditions and the low standard of living, and one of the Austrian military doctors gives a pre-war list of tuberculosis mortality in a number of cities as follows:

Mortality due to tuberculosis.
Deaths per 100,000 population.

Belgrade	720*
Athens	393.3
Vienna	289.4
Berlin	186.3
Dresden	184.1
Hamburg	154.9

*Pre-war population of 77,500.

But the figure of 720 is lost sight of when one considers the official Austrian record of deaths from tuberculosis recorded for the year 1917, in the city of Belgrade which totaled 654. This in a population of 45,000 in 1917, gives a tuberculosis mortality of about 1,430 per hundred thousand!

The fall of 1918 saw the collapse of the Central Powers; and the remnants of the Serbian army returned to their homes to find them sadly depleted, with the task of reconstruction looming before them, as well as the great necessity of initiating steps to protect the health of their people in order to conserve their race. Their first winter at home saw a serious outbreak of typhus with an inadequate organization to combat it, and the whole country rife with disease. There are only a little more than 100 doctors in Serbia at the present time. The American Red Cross and the Serbian Relief Committee of America have inaugurated public health programs in the country, but unless they continue or without some form of continual outside aid, the few doctors have a task ahead of them which is difficult indeed.

Causes and Remedy of Malnutrition.—It is estimated that from three to six million American children are not getting enough to eat. These children are usually delicate and readily susceptible to disease. They are frequently those children who are considered lazy and backward. The causes of malnutrition are primarily poverty and ignorance. Many children go hungry because their parents cannot afford to buy enough suitable, nourishing food. In other cases the mothers do not know how to buy foods sanely and wisely. They know very little concerning a proper and adequate diet. In other cases the mothers do not have sufficient control over their children to induce them to eat proper foods and to make them take the sleep and rest necessary for their development. The best way to overcome malnutrition is by the establishment of malnutrition clinics and classes, where children may be instructed concerning proper diets and good health. Mothers should be invited to attend these classes, and later the education may be carried into the homes through visiting instructors. Malnutrition classes have been formed in Boston, Chicago and New York with success. Other means of combating malnutrition are by establishing school lunches and by instituting medical supervision over school children. Defects that are observed should be corrected.—*Children's Bureau Bulletin*, Aug. 4, 1919. (*M. P. H.*)

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Outbreak of Dysentery.—The Medical Officer of Health for Aberdeen, England, records an outbreak of dysentery in that city which has many interesting features. Attention was directed to a small group of cases with febrile and diarrhoeal symptoms which were regarded at first as possible cases of influenza of a gastro-enteric type. Inquiry revealed the fact that all the cases were being supplied with milk from one dairy. All the farmers supplying this dairy were communicated with and it was found that on one of the farms certain cases of severe diarrhoeal symptoms had occurred in the family of the farmer a few days before the outbreak in the city. Further investigation of the cases at the farm made it clear that they were of the same type as those in the city and that they had been the source of infection. A bacteriological study of the outbreak revealed the fact that the cases were bacterial dysentery, the bacillus being of the Flexner type.—*Medical Officer*, Aug. 2, 1919, 41. (*D. G.*)

VENEREAL DISEASE CONTROL: METHODS, OBSTACLES AND RESULTS

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Read before Section of Public Health Administration, American Public Health Association, at New Orleans, La., October 27, 1919.

This is really a report of progress. Co-operation of the Government with state health departments has produced such results that the backward step of discontinuance can never be taken. The problem of preventing venereal disease has become one of the principal phases of preventive medicine and physicians and health officers can not possibly longer remain indifferent.

One object in discussing the methods, obstacles and results of the venereal disease control program is to bring forth constructive criticism which will enable the state boards of health and the Public Health Service to improve the methods, remove the obstacles and thereby secure more satisfactory results. The desired objective can be accomplished when the cause and serious nature of these diseases are generally understood; the necessity for treatment of infected persons is appreciated; a sympathy and understanding of the general problem is developed; and when each local community has accepted responsibility for enforcing measures that will make the spread of venereal diseases more difficult.

METHODS.

The foundation for the plan to be used in combatting venereal diseases in the United States was expressed in the Act of Congress creating the Division of Venereal Diseases in the Public Health Service. The method was stated as one of the duties of the Public Health Service—"to co-operate with state boards or departments of health for the prevention and control of such diseases within the states." The entire program has been created upon this principle—one of co-operation between the Public Health Service and the various state boards of health. It should be remembered that at the time this responsibility was placed upon the Public Health Service, the country was involved in war, and there was necessity for immediate action. The fighting forces, actual and potential, urgently required protection. It was, therefore, necessary to launch at once a campaign for the prevention and control of a group of dangerous, communicable diseases which differed from all other communicable diseases for the reason that social, moral, economic, ethical and psychological problems had to be considered in addition to the medical measures. To add to these complications, it was necessary to plan a comprehensive and uniform system for the control of venereal diseases which would be applicable to the entire United States, which could be operated by a practically untrained personnel and which, furthermore, would fit in as a part of the other activities of the state boards of health. It is evident, therefore, that no easy task confronted the Public Health Service and the various state boards of health. The difficult conditions were met, however, by concerted action on the part of the state boards of health until at the present time a practically uniform method for the control of venereal diseases is actually in operation in the United States. The de-

tails of the plan have been discussed in numerous articles appearing in the Public Health Reports during the past two years and as these details are familiar to health officers and other sanitarians it is unnecessary to discuss them here.

It has been customary in discussing the plan to group the various activities as medical, educational, legislative and social measures. However, no arbitrary grouping of these measures is possible. Medical effort is in the best sense educational. Education in this field includes medical and legislative information, and both are vitally social in addition to the activities of a distinctly sociological nature on which the permanent control of syphilis and gonorrhea, as of other communicable diseases, depends.

OBSTACLES.

Without devoting time to the discussion of the methods used, since they are a matter of record and can be studied by anyone interested, it would be of interest to refer briefly to some of the obstacles encountered so that in further development of methods these obstacles may be more easily overcome.

One of the greatest obstacles encountered has been, in my opinion, the reluctance of a certain percentage of practicing physicians to participate wholeheartedly in the program for venereal disease control and report their venereal infections to their state board of health. This attitude on the part of certain doctors was expected and is being gradually overcome. The same reaction occurred when tuberculosis was made reportable many years ago, the argument being advanced then that a stigma would be placed upon the family by the physician reporting cases of tuberculosis, a stigma which would prevent the social and economic advancement of the tuberculous family. This view has of course long since been proven erroneous and now the general population of the country is more or less educated as to the value of reporting communicable diseases with the exception of gonorrhea and syphilis. The co-operation of physicians in reporting venereal diseases is, however, developing rapidly and each month shows progress. Reporting by serial number only, except under certain conditions, the plan adopted by forty states, certainly removes the objection that professional confidences are violated by reporting gonorrhea and syphilis to the state board of health. The conditions under which the name and address of an infected person are to be reported being the failure of the infected person to observe precautions to prevent the spread of the disease to others or failure to continue treatment, are such as to legally forfeit any personal rights the patient may have possessed. It is a well established principle of constitutional law that no individual right or privilege can be claimed which reacts to the detriment of the rest of the community or the general public.

The reason that reporting by serial number was endorsed by the Public Health Service, rather than by name on the first report as with other communicable diseases, was because reporting by serial number furnishes data regarding the prevalence of these diseases and, further, because it was believed to be impossible to quickly get forty states to include syphilis and gonorrhea among the diseases to be reported by name until the program for control of these diseases was better understood and its value more appreciated. The time will come when reliable data regarding syphilis and gonorrhea will be on file in the various state departments of health to show the exact progress that is being made in limiting the spread of these dangerous, communicable diseases.

Another obstacle to the progress of the work has been the lack of information on the part of the general public regarding the serious consequences of the venereal diseases. This lack of information has been due partly to the indifference

of many physicians towards persons infected with venereal diseases. The method of treatment of individual cases and the advice given for preventing the spread of the infection, has been such as to lead infected persons to regard their condition lightly. False modesty and prudery has prevented the discussion of these diseases by intelligent laymen and therefore but little authentic information was available until very recently.

This ignorance of the general public has been not only of uneducated persons, but of the business men and leaders of the community. Contrast the opinion of the ordinary substantial citizen of your community with the opinion of Sir William Osler, who said, "From the standpoint of race conservation, gonorrhea is a disease of the very first rank. It costs the country, annually, thousands of lives. With 30 or 40 per cent of all congenital blindness, with chronic pelvic mischief in women and with the unhappiness of sterile marriages—with these and many other minor ailments scored up against them, we may say that while not a killer, as a misery producer Neisser's coccus is king among germs." Contrast also the view of the business man in regard to syphilis with the actual facts in regard to this infection. Comparatively few people realize that syphilis is one of the greatest killing diseases; that all of the deaths now accredited to locomotor ataxia and general paralysis of the insane are due to syphilis; that many deaths now attributed to organic diseases of the heart, diseases of the arteries, aneurism, cerebral hemorrhage, apoplexy, Bright's disease and encephalitis, are really due to syphilis. Nor is it realized that a tremendous burden of taxation is placed upon every community as a result of the sequelae of improperly treated cases of syphilis and gonorrhea. This ignorance regarding venereal diseases is rapidly being overcome by the educational campaign carried on by the various state boards of health. In the educational campaign the previous reticence of newspapers and other publicity agencies in informing the public regarding sex problems and venereal diseases, is being rapidly changed. In addition to developing proper publicity leading to the discussion of these diseases, it is necessary to restrict the misleading publicity given to remedies advertised for the self-treatment of venereal infections and the false statements of unscrupulous persons promising impossible cures.

Another obstacle to the successful prosecution of the program for venereal disease control has been the mistaken opinion held by many honest persons that regulated prostitution is necessary and cannot be eliminated. The result of following this opinion has been responsible in many communities for hindering the venereal disease control program of state boards of health.

The advocates of segregation claim that this measure concentrates prostitution, thus facilitating the control and reduction in the number of prostitutes. The truth is that segregation increases prostitution, making it familiar by continual advertising. A segregated district offers a place of commerce to the least competent of prostitutes, mentally and physically.

The advocates of segregation also claim that such a procedure prevents crimes against women. The actual facts are that the existence of houses of prostitution incite to crimes against women by fostering sexual promiscuity and providing a source of sexual brutalization and degeneracy.

It has also been claimed that segregation protects a community from offensive and detrimental proximity of prostitutes, whereas the truth is, that it exposes the community to this condition. By advertising prostitution as a community necessity and by making prostitutes easily accessible and tolerated, a condition is established conducive to the spread of venereal diseases within the community.

Another obstacle in the progress of the campaign has been the hesitancy of health officers to assume any function which would tend to indicate that they were departing from the usual methods of controlling communicable diseases. For instance, some health officers believe that it is not a function of the health authorities to be interested in the operation of laws having for their purpose the abolition of prostitution, this being regarded as strictly a police function. As a matter of fact, all of the power of boards of health are police powers and the laws enacted for the elimination of prostitution are, so far as health departments are concerned, laws to prevent or at least make difficult, contact between healthy persons and persons infected with dangerous, communicable diseases. When health officers accept this viewpoint, considerable progress will be made in controlling venereal infections.

RESULTS.

The results to date of the co-operative work of the Public Health Service and the state boards of health for the control of venereal diseases cannot adequately be summed up with statistical data, but some of the outstanding facts may be briefly mentioned. The requirement that venereal disease be reported to state boards of health is gradually being met by the practicing physicians of the country. In response to a circular letter sent to physicians, 60,666 have signed a written statement to the effect that they intend to co-operate with their state board of health by reporting cases of venereal diseases. The records for the fiscal year ending June 30, 1919, showed that in forty-two states, 239,502 cases of venereal disease have been reported. Of these, 131,193 were gonorrhea, 100,466 were syphilis and 7,843 were chancroid.

These figures show plainly how syphilis and gonorrhea are regarded by both the laity and physicians. It is generally accepted as a fact that there are at least five times as many cases of gonorrhea as syphilis, but during the past year the number of cases of gonorrhea reported exceeded the number of cases of syphilis only about 30 per cent. This, in my opinion, shows that gonorrhea is still regarded as a relatively unimportant disease. The total number of cases reported is not great, but it should be remembered that many of the states did not have laws or state board of health regulations requiring these diseases to be reported until late in the year.

Another evidence of progress is the increased number of free clinics where cases of venereal disease may receive proper treatment. On June 30, 1919, the various state boards of health reported that there were approximately 260 free venereal clinics being operated under their direction. Many of these clinics are not yet making monthly reports to the Public Health Service, but 162 clinics that did report during the fiscal year ending June 30, 1919, treated 64,164 persons. These figures may also be criticised as insignificant, but when it is remembered that during the previous year no reports were available and that during the year in question only about one-half of the clinics made reports, it is felt that very substantial progress is being made towards securing prompt and efficient treatment for persons infected with venereal diseases. This progress is at an increasing rate, this being definitely shown by the reports for the month of July, 1919, when 5,642 new patients were admitted for treatment to 131 clinics whose reports were available at the time this paper was prepared.

The results of educational and publicity measures cannot be adequately expressed in figures. It is known that the various state boards of health and the Public Health Service have prepared and distributed more than fourteen million separate pieces of literature, mostly leaflets, on the question of venereal disease. The real effect of this widespread publicity

can never be definitely known, but all those in touch with the problem know that one effect has been to greatly stimulate interest on the part of the general public in this phase of public health work. It is also known that the general public are appreciating more and more the necessity for prompt and efficient treatment of these infections. This is shown by the reports to the effect that the practice of all specialists in genito-urinary and venereal diseases has greatly increased during the past year. Seventy-seven thousand two hundred and ninety-eight individual letters have been received by the Public Health Service asking for literature in regard to the venereal diseases, and 1,339 letters have been received in which the writer frankly stated that he had gonorrhea or syphilis, and asked for advice.

The problem of preventing venereal diseases has been removed from the list of neglected opportunities and made one of the principal phases of preventive medicine toward which it is no longer possible for the individual physician or health officer to maintain an isolated or indifferent attitude.

CONCLUSION.

To sum up briefly the methods, obstacles and results of the program for venereal disease control, I am of the opinion that the following is a fair statement of the present status of this work:

The method was definitely determined by Congress and is in actual operation—that is, co-operation between the various state boards of health and the Public Health Service for the prevention and control of venereal diseases.

All obstacles could be entirely removed if sufficient funds were provided to employ trained and enthusiastic personnel to actively stimulate the various phases of the program and secure the interest of business and professional men.

The result of the work up to the present time has been to put into action an increasingly great organization of business and social agencies interested in co-operating with health authorities for the elimination of these dangerous communicable diseases. The work has acquired such a status that it is absolutely out of the question that it should ever be discontinued or even be seriously interfered with. Therefore, we may confidently look forward to the future with the assurance that every official health agency of the United States will gradually increase its facilities for meeting today's world problem in disease prevention.

□

DISCUSSION

In the discussion of Major Pierce's paper, *Thomas W. Jackson, M.D.*, Assistant Commissioner of Health of Pennsylvania, spoke in place of the Commissioner, Edward Martin, who was regretfully absent from the meeting. The discussion outlines the program and principles underlying the attack on the problem of venereal disease control in that Commonwealth.

"In Pennsylvania we have a major campaign," said Dr. Jackson, "and a minor campaign. Most of our time, effort and money are spent in the major campaign but the minor one is not neglected although it is recognized as minor."

Our Major Campaign embraces the following objects and measures:

I. The elimination of the prostitute.

The feebleminded of this class are to be institutionalized; the subnormal and normal are to be put at self-supporting work. All are to be rendered non-contagious.

Our means of accomplishing these ends are (a) the application of existing, adequate laws, enforced through and by local health committees of able and determined women, who form an integral part of the State Health Department in all counties and communities. In our state the *County* is the administrative unit. (b) The utilization of hospitals, reformatories, county infirmaries, asylums and the

resources of certain organizations devoted to civic betterment. (c) This is all to be done quickly, systematically and persistently. (d) It is the opinion that raids are corrupting, brutal and futile.

II. Controlling and curing the infected through (a) the state clinics and (b) venereal clinics established in practically all hospitals of the state. The clinics are to conduct an active campaign against carriers, to control these diseases in the regions which they serve; the personnel of these clinics to be responsible for this control. They have police powers and quarantine powers. The following regulation, with the force of law, was recently passed by the Advisory Board and was approved by the Commissioner of Health August 6, 1919.

"From and after the passage and promulgation of this regulation, gonorrhea and syphilis in its primary and secondary stages, and chancroid are declared transmissible diseases subject to quarantine when in the opinion of the attending physician or the county medical representative of the State Department of Health, the character, occupation, habits or neglect of treatment and methods to protect others, make those infected menaces to public health."

III. Efficient immediated treatment through packages and wide knowledge of their usefulness and where they may be found. Most of the drug stores in Pennsylvania now sell a simple and efficient package. Approved after careful laboratory tests by the Department of Health and sold for twenty-five cents. The state newspapers have announced that such packages are to be secured.

IV. The suppression of quack medicine advertisements, which is made possible by Pennsylvania laws.

V. In seaports enforced protection against the large influx of fresh venereal cases.

VI. The elimination of the pimp, cadet or panderer by means of the strong arm of the law.

Turning to what we style our Minor Campaign, the first measure to be mentioned is (I) Education. (a) In every school in the State, as a part of a systematized and graded course in health, sexual function and venereal infection will be taught judiciously. (b) Group talks to adults and adolescents are to be given but unless followed by the teacher meeting the class individually they are of little value. People who like to do this teaching are usually unfitted for it. It calls for a special and rare ability. There will be coöperation with the State Department of Education in this matter. (c) Newspapers, pamphlets and leaflets: We deem them moderately useful. (d) Placards: We deem them useful as indicating the location of state clinics and the value of the immediate treatment package. (e) Motion Pictures: We fear that they are usually more hurtful then helpful. Those dealing with anatomy and pathology are the only ones we view as particularly valuable. None should be shown commercially.

II. Other agencies are recreation, amusements and occupational night schools, constituting a group of great value.

Finally, there is another combination of favoring agencies entirely too potent to be described as minor measures. These agencies are equally vital and equally helpful in nearly every public health problem when provided. They are improved housing and bettered living conditions. They have a bearing upon venereal-disease-control methods so obvious that they need not be specially dealt with in this enumeration.

Dr. Harris characterized the movement as a "going campaign." He referred to the fact that in the public prints the State of Pennsylvania has been termed as inactive in attacking the venereal problems. "This is not true," he said, "and has never been true." He brought the program and campaigns to bear as evidence against the statement, and asserted that Pennsylvania spends liberally for health purposes and offers its coöperation to every other state in the Union. "We are striving to control an infectious, communicable disease sanely," said the speaker in conclusion, "and at present time do not feel the need for additional laws. In the coördinated, statewide social service, emphasis is placed to the utmost on moral teaching."

The A. P. H. A. Goal for 1920 Is 7,500 Members. The More Members the Greater Its Influence and the More It Can Do. Will You Help?

Passing from construction to disease relations, two maladies are here considered in connection with the privy. Dr. Ferrell discusses hookworm and gives a few rules that can eliminate the link of soil pollution. Dr. Smith presents results in typhoid and asserts that the sanitary privy, properly maintained can be an important factor in its control.

ROLE OF THE LATRINE IN CONTROL OF HOOKWORM DISEASE

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Director for U. S., International Health Board, New York City.

Presented Before the Public Health Administration Section, American Public Health Association, at New Orleans, La., October 27, 1919.

The spread of hookworm disease is attributable to the improper disposal of human excreta. To the end that the work of hookworm control and prevention may be advanced, a series of surveys of individual homes has been made with reference to hookworm infection, and to the method employed in disposing of human excreta. The 1918 study included 95,706 homes in 236 rural areas in this and in other countries. It showed that only 9.8 per cent of the homes had adequate latrine accommodations, and that 53 per cent were without latrines of any description. Considerable reduction in the prevalence of hookworm disease has been obtained by curing those who showed infection, but in the absence of soil sanitation the re-infection rate, especially in tropical countries, runs quite high even within one year after the time of original cure. This has been pointed out in the 1918 Annual Report of the International Health Board.

The crux of the hookworm problem then is twofold:

(1) To prevent the soil from becominfected, i. e., to prevent the deposit of ova-impregnated feces upon the surface of the ground; and

(2) To prevent infected soil from coming in contact with human beings. This means both that the skin of the feet or hands, for example, should not come in contact with the infected soil, and that no one should eat foods which have been exposed to infected soil.

It is the role of the latrine, in the absence of sewage disposal plants, to give general and permanent protection against hookworm disease. The problem, which is essentially rural, can be solved if the following procedure is carried out:

1—Construct at every home an adequate latrine to serve as a receptacle for human discharges.
2—Educate every man, woman, and child to use the latrines.
3—Educate all persons to care for and maintain the latrines properly.
4—Employ, by way of public health protection, a sufficient number of inspectors to carry on the educational work and, when necessary, to use legal measures for the enforcement of sanitary practices.

Theoretically, the carrying out of this program is quite simple. Practically, it is a most formidable task. As suggested by the figures given above, it involves inducing a majority of the people in rural districts (1) to abandon habits ingrained by centuries of custom; (2) to purchase material for structures hitherto regarded as unnecessary; and (3) to devote a considerable amount of time and labor to the building and maintenance

of the latrines. The undertaking has been complicated by a lack of scientific information regarding many aspects of the problem. The health officers were therefore unable to specify minimum latrine requirements for any particular locality. Fortunately, a number of scientists are now seriously at work seeking the necessary information. Among health officers, moreover, fairly uniform ideas are gradually developing as to types of latrines, and plans and specifications of one or more types that will be acceptable have been widely distributed.

During recent years measures have been taken in many countries for the control of hookworm disease, and progress in curative measures has been relatively rapid. The people have been urged to install, use, and maintain sanitary latrines. Progress in soil sanitation, however, as might have been expected, was comparatively slow at first. An intensive house-to-house campaign has been found necessary to obtain the best results. During the more recent years considerable progress in this phase of the work has been made and the movement has now acquired considerable momentum. In this country there are now three southern counties each of which has reported that a latrine which meets the minimum requirements of the State Board of Health has been installed at every one of its rural homes. These counties are Harrison, Stone and Jackson, in Mississippi. The task was first completed in Harrison county. In accomplishing it the county health department had the co-operation of both the Mississippi State Board of Health and the United States Public Health Service. In various other southern counties the record of latrine construction for rural homes ranges between 50 and 100 per cent. Ten southern state boards of health reported that during 1918 an aggregate of 4,586 new latrines were erected and 15,568 old latrines improved. This is a striking increase over the results of previous years.

North Carolina has enacted a statewide law which requires that all latrines situated within 300 yards of a home shall be constructed and maintained in a manner satisfactory to the State Board of Health. The law applies to approximately 85,000 latrines in the State and places an annual inspection tax of forty cents on each. The proceeds will be used to pay a staff of sanitary inspectors who will educate the people along health improvement lines, and who will enforce the provisions of the law.

Hookworm disease is not commonly a reportable disease. Consequently there are few morbidity and mortality statistics to aid in ascertaining its prevalence at any particular date. A series of infection surveys will be necessary to give a reliable index of the degree to which the disease may be reduced by the use of sanitary latrines. Considerable data are available showing the reduction obtained by curative measures, the extent to which re-infections occur, and, to a limited extent, the degree of control effected by the prevention or reduction of soil pollution.

In St. Vincent, 1,525 persons who two years previously had been reported as cured were re-examined in 1918, and it was found that 60.5 per cent of them were infected. The re-infection rate was 46.9 per cent in the Belair district, 64.8 per cent in Calliaqua, and 68.2 per cent in Sion Hill. It was lowest in Belair, where the greatest amount of sanitary work was done. In Trinidad, the amount of re-infection was found to vary with the sanitary condition of the districts. Areas with very poor sanitation invariably had more than 60 per cent re-infection, and even districts in which the sanitary conditions were good had relatively high rates of infection if poorly sanitated districts surrounded them. Both of these islands, it should be remembered, are in the tropics, where climatic

conditions render control measures more difficult than in temperate zones. As the sanitary work progresses, a number of infection surveys will be made from year to year in average areas, and in time the role of the latrine in the control of hookworm disease can be shown by indisputable figures. However, even the limited data now available offer encouragement.

Typhoid fever is a reportable disease. Its prevention has so much in common with hookworm disease that its reduction through the use of adequate latrines should be very suggestive. A few striking examples of typhoid reduction which have appeared in reports by state boards of health are therefore presented. In Wicomico county, Maryland, for the period from January 1 to October 1, 1916, there were 78 cases of typhoid fever; in 1917, for the same period there were 76 cases. In 1918 a campaign to encourage health education and the building of sanitary latrines was conducted, with the result that several hundred new latrines were built and many old ones remodeled. In 1918—during a 6-month period, as in 1916 and 1917—there were only 26 cases of typhoid fever, this figure being 66.2 per cent lower than the average rate for the two previous years. In North Carolina, nine counties having an aggregate population of 305,016, for the four-year period of 1914 to 1917, had 478 deaths from typhoid fever—a yearly average of 119.5 deaths, or 39.2 deaths annually per hundred thousand. During 1918, 6,480 improved latrines were installed in these counties, with the result that the annual typhoid death rate was reduced to 24 deaths, or 7.9 deaths per hundred thousand. The typhoid reduction in Virginia during the past ten years is particularly striking. Several charts just issued by the Mississippi State Board of Health also give in a graphic manner concrete examples of typhoid reduction following the installation of sanitary latrines. The Doubtless the Mississippi State Board of Health will be pleased to furnish copies of these graphs to interested persons. These examples may be regarded as typical of the very important role of the latrine in rural sanitation.

ROLE OF THE SANITARY PRIVY IN THE CONTROL OF TYPHOID FEVER

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Read before Section of Public Health Administration, American Public Health Association, at New Orleans, La., October 27, 1919

There is no one factor more responsible for the spread or control of typhoid fever than the privy. Properly handled, the sanitary privy eliminates the spread of typhoid to a very great extent. Typhoid fever is an intestinal disease of human beings only, and is, therefore, spread through the careless handling of the discharges of the intestines and kidneys. The sanitary privy offers a safe method of disposal of these discharges, often more so than a sewerage system. The properly operated sanitary privy eliminates soil pollution and if properly constructed it eliminates fly-borne typhoid insofar as the privy is concerned.

It is not my intention to burden you with a long paper concerning the control of typhoid fever by means of the sanitary privy, but instead I am going to give you my personal experience, while health officer of the city of Greenville, S. C., with the hope that it will stimulate a discussion which will bring out points of importance and interest.

We installed the sanitary privy system in Greenville on January 1st, 1915. (The ordinance was passed in 1914 to take

effect January 1st next succeeding.) Previous to this time the number of cases of typhoid fever ran from 35 to 45 per year. During the first six months of 1915 we had 3 cases reported, all of which were of doubtful origin, but from the middle of 1915 to September 1st, 1918, there was not a case of typhoid fever reported in Greenville that could not be traced directly to outside infection. For more than three years there was not a single case of typhoid fever in the city of Greenville of local origin, and this city had over 1200 shallow wells that were used for supplying water for drinking purposes. The Health Department declared war on typhoid fever and the sanitary privy was chosen as the means of defense. The property owners were compelled to install sanitary privies equipped with cans. The city supplied the scavanger service, which, of course, was not operated for profit. The contents of the cans were not allowed to be transferred on the premises. The scavenger wagon would start out in the morning with a load of clean cans fitted with tight-fitting friction covers. These clean cans were exchanged for the cans found in the privies. When the wagon had accumulated a load of full cans they were driven to the place of disposal, which consisted of a concrete basin 10 ft. by 10 ft. and 4 ft. deep. This basin was connected with the city sanitary sewer. The contents of the cans were emptied into the basin and flushed into the sewer. The outlet of the basin was provided with a heavy iron grating which prevented sticks, rags and other articles from passing into the sewer main. Everything that would not pass through the openings in the gratings was cleaned out and disposed of by cremation, after which the basin was thoroughly washed. The cans were then stacked on their sides in the basin and washed with a one-half-inch stream of water under 70 pounds pressure. The cans were then rinsed in a 2 per cent solution of one of the coal tar disinfectants, when they were ready for another trip.

The privy box should be absolutely fly-tight and the openings should be provided with tight-fitting covers. The vent flue should be screened at the top.

By using metal cans for receptacles for the night-soil and emptying the can only at the place of disposal, soil pollution is prohibited. By screening the vent flue at the top the flue is made to serve the purpose of a fly trap, as any flies that happen to find their way into the privy box will eventually work their way up the flue where they will remain until they die.

I am thoroughly convinced that the sanitary privy, when properly constructed, maintained and operated, plays a very important role in the control of typhoid fever. I can, however, see where an improperly constructed, maintained or operated privy would be little, if any, better than the old familiar open back E type privy, since the users might possibly think that they were getting a protection that did not exist and in consequence be more careless than they would with the old type.

The A. P. H. A. Does Not Often Get to the West Coast.
Do Not Miss This Opportunity!
San Francisco, August 30-September 3, 1920.

USES, POSSIBILITIES AND LIMITATIONS OF BACTERIOLOGY IN FOOD CONTROL

PROFESSOR EDWIN O. JORDAN,

Department of Hygiene and Bacteriology, University of Chicago, Chicago, Illinois.

Read at joint session of Sections on Public Health Administration, Laboratory and Food and Drugs, American Public Health Association, at New Orleans, La., October 29, 1919.

The question presented to me for consideration is the uses, possibilities and limitations of bacteriology in food control. I have elsewhere[1] discussed some of the limitations of bacteriology in food control and there seems no need to repeat this task. At the present time it may be more useful to review some of the opportunities for extending the applications of bacteriology in food examination.

As regards the bacteriology of the milk industry it is certainly true that the large amount of work done by American investigators has thrown much light on the sources of milk contamination and has enabled us to evaluate fairly well the relative share of the cow and the milker, the barn surroundings, utensils and methods of transportation as they affect the number of bacteria in the milk delivered to the consumer. No one can doubt that the information thus obtained has been of great value in improving the quality of city milk supplies in this country. This has come about largely through insistence on the correlation between the bacterial findings and the various physical conditions surrounding the collection and transportation of this highly perishable food substance. It is chiefly through the interpretation of colony counts in the light of practical farm and dairy inspection that the excellent practice of milk-grading has become possible. It is evident, however, that there remain numerous questions about which opinion is at variance, an indication in itself that the available evidence is insufficient and that more investigation is needed. Our knowledge of the bacterial products ordinarily present in dirty or stale milk and of their influence on health is quite meager. Different answers will doubtless still be given to questions about the permissible bacterial limit for milk that is to be submitted to the pasteurizing process and the degree to which this limit should be correlated with the temperature at which the milk has been kept and the initial seeding that the milk has received. Can a certified milk kept under cleanly conditions, but in which bacteria have multiplied to a relatively high point be used with safety after pasteurization? Should a milk that has received considerable bacterial contamination shortly before pasteurization be pronounced injurious to health? One has only to ask these questions to feel again the necessity for knowing more about the nature and physiological action of the bacterial products formed in milk. To quote from an earlier paper[1]: "We simply do not know at what point the products of bacterial growth become hurtful, or even what effect is caused by the growth of specific kinds of bacteria. Are most of the products of bacterial growth in foods physiologically indifferent in the quantities in which they are ordinarily consumed, and when injurious products are present, are they due to rare accidental contamination, or do all bacteria growing in milk, meat or eggs generate noxious substances which

1. The Bacteriology of Foods: Jour. Amer. Med. Assoc. 1917, 68, p. 1080.

1. J. A. M. A. 1917, 68, pp. 1080-1084.

can inflict damage on the human organism, albeit such danger is not immediately recognized? Such questions cannot be satisfactorily answered at the present time, and need but to be asked to make clear the limitations of our present knowledge and the necessity of further investigation."

As respects the significance of special groups of bacteria in milk important studies have been made by Ayres and his associates in the Bureau of Animal Industry. The alkali-forming bacteria in milk, meaning by this term those bacteria that produce an alkaline reaction in milk without visible signs of peptonization, appear to be principally soil bacteria introduced into milk from dust, unsterilized utensils or through the dirty hands of milkers.[1] The much discussed question of the significance of the enumeration of colon bacilli in raw milk seems to be approaching solution. Ayres and Clemmens[2] point out that the colon count as determined at the present time includes both the *B. coli* and the *B. aërogenes* types of organism and that since the *B. coli* type is chiefly of fecal and the *B. aërogenes* type of nonfecal origin, the colon count at best cannot be a direct measure of manurial contamination. They add that "In milk of unknown history no significance can be attached to the colon count other than that high counts usually indicate that it has been held above 50° F. (10° C.), or rarely, that it was produced under very abnormal conditions." From the results of these investigators it does not appear that the differentiation of the *B. coli* and *B. aërogenes* types assists materially in tracing the conditions under which milk is produced, but as they themselves admit, examination of a larger number of samples may show that it possesses some value.

Little is yet known about the significance to the public health of the presence of *B. abortus* in milk. This organism which is the cause of enormous loss to the dairy industry—even greater than that caused by bovine tuberculosis—is wide-spread and has been found in certified milk. It seems probable that it is not pathogenic for man, but we should have more definite information. In guinea pigs the inoculation of *B. abortus* has been shown to produce lesions of the lymph-nodes, spleen, liver, kidney, testicle, lung and bones.[1] A considerable proportion of children show the presence in their blood of antibodies for this organism. It is not known how far this is due to passive and how far to active immunization.[2] The significance to human pathology and public health of another organism of bovine abortion recently discovered by Theobald Smith,[3] *Vibrio fetus,* is quite unknown.

An important set of problems has been opened up by the discovery of the relative frequency of botulism in this country. It seems to be true that different varieties of *B. botulinus* exist possessed of very different degrees of heat resistance, and that some strains found in the United States are much more resistant to high temperatures than was the organism originally described by van Ermengem under this name. Practically nothing is known, however, about the normal habitat and distribution of this dangerous pathogen. It has never been reported in Great Britain, and the majority of the instances of botulism in the United States have occurred west of the Rockies. Fortunately in most, perhaps in all, cases where significant growth of this organism has occurred physical signs of

1. Ayers, Rupp and Johnson: Bull. No. 782, Bureau of Animal Industry, June 17, 1919.
2. Ayers and Clemmens: Bull. No. 739, Bureau of Animal Industry, Dec. 30, 1918.

1. Larson and Sedgwick: Am. Jour. Dis. of Children, 1913 6, p. 326.
2. Sedgwick, Larson and Ramsey: Am. Jour. Dis. of Children, 1915, 10, p. 197; Coolidge; J. Med. Res. 1916, 29. p. 459.
3. J. Exp. Med., 1919, 30. pp. 899-859.

decomposition are present and should serve as a signal of warning.[1] Articles of food heated by the method of household canning have been implicated with especial frequency in botulism poisoning.

Discussion of the relation of bacteriology to the great canning industries may well be deferred until the results of the extensive investigations by Rosenau and his associates at the Harvard Medical School become available. As far as this work has advanced it appears to Rosenau to warrant the statement that "it is becoming increasingly evident that canned goods are the safest foods that come to our table."[2] It is interesting to note that increasing stress is being laid by the canners on systematic inspection and that detailed regulations for inspection have recently been drawn up by the National Canners Association.[3] These regulations deal with such matters as factory location, lightness of rooms, cleanliness of rooms and utensils, wash rooms, toilet rooms, cleanliness and health of employees. It is the writer's belief that bacteriological methods may be used to supplement physical inspection at many points and will serve to reveal weaknesses in procedure that might not otherwise be detected. It seems likely that the condition of certain finished food products may be determined at least as definitely by physical signs as by bacterial examination.

Food-borne infection with members of the paratyphoid-enteritidis group is by far the most important of the typical forms of food poisoning that have been traced to their source. It is, however, to judge from the recorded instances, much less common in this country than in Germany, France or England. The whole subject of paratyphoid-enteritidis infection bristles with unsolved problems. We do not know whether bacilli of the *B. suipestifer* type are pathogenic for man, we do not know the significance of the occasional occurrence of bacilli of the *B. paratyphosus B* type along with *B. suipestifer* in the bodies of diseased hogs, we do not know the relative share of human carriers and diseased food animals in causing infection or poisoning through food products. Despite numerous careful investigations the nature of the toxic agent produced by these organisms remains obscure. Ecker,[1] however, has shown that some strains produce soluble toxic substances which apparently stimulate the formation of specific antibodies when injected subcutaneously. Greenwald,[2] working more recently with a series of selected strains, has failed to demonstrate the presence of a heat stable toxin, and in general the results of animal feeding with the products of this group of organism have not given constant and unambiguous results.

In summing up the future outlook for the application of bacteriology in food control it seems probable that increasing emphasis will be laid on bacterial methods as an aid to the interpretation of the sanitary inspection of foodstuffs and as a guide to satisfactory sanitary procedure. Continued laboratory investigation of the two best-known instances of so-called "food poisoning" traceable to primary bacterial food contamination, botulism and paratyphoid meat-poisoning, seems urgently called for since both are intimately connected with the vital problems of food conservation. Finally the nature and sanitary significance of the products generated by bacteria, particularly the so-called saprophytic bacteria, in foodstuffs affords a practically untouched field for investigation.

1. Signs of spoiling are, however, sometimes disregarded and the obviously spoiled food eaten. An example has been recorded by Thom and his coworkers—J. A. M. A. 1919, 73, p. 907.
2. Amer. Food Jour., June, 1919, p. 40.
3. Amer. Food Jour., Apr., 1919, p. 32.

1. Jour. Inf. Dis. 1917, 21, p. 541.
2. Amer. Jour. Pub. Health, 1919, 9, p. 895.

DISCUSSION

Discussion of Professor E. O. Jordan's paper by *H. W. Redfield, Ph.D.*, U. S. Department of Agriculture, Bureau of Chemistry, Washington, D. C.

It seems to me that we must consider this subject from two points of view. First, from that of the investigator who has ample time and opportunity to study minutely the floras of food stuffs in order to identify definitely the causes of poisoning, of spoilage, etc., and second, from that of the bacteriologist who is charged with protecting the public from inferior or harmful foods, and who must in that capacity examine such a large number of samples in a short period of time that it is impossible for him to study very closely the floras of the samples with which he must deal.

To the investigator Prof. Jordan has pointed out a great number of problems concerning which our knowledge is at present inadequate and which urgently demand immediate study. He has not, however, touched more than casually upon the uses which can be made of bacteriology by the very busy food bacteriologist employed in control work in deciding the fitness or unfitness of these food products with justice alike to producer and consumer. Such a bacteriologist not only has a great responsibility, but he has a very real problem, and I should like to discuss this problem briefly.

I believe that the large majority of those here will agree with me in the statement that the control bacteriologist in examining bottled table water cannot be expected to make examinations for *B. typhosus*, for *Sp. cholerae*, for *B. paratyphosus A*, for *B. paratyphosus B*, for *B. enteritidis*, etc., etc., etc. If he is examing milk he cannot be expected to test for all of these and for alkali forming bacteria, peptonizing bacteria, *B. abortus*, *Vibrio fetus*, etc. Neither if he is examining frozen eggs can he be expected, in the time at his command, to analyze the flora which he will find. Without mentioning them in detail, the same is true in principle of all of the foodstuffs with which he may have to deal. I grant you that it would be most desirable if the bacteriologist doing routine work could in the case of each sample submitted to him make examinations for all of the organisms which might have any significance in that particular foodstuff, but this he cannot do—he cannot make a public health interpretation of every bacterial count. It would make the cost of inspection prohibitive, it would cut down to unwarrantable limits the number of samples possible to examine, and it is not an indispensable necessity.

What then can the food control bacteriologist do? He can begin by dividing foodstuffs into stable and perishable. Stable foodstuffs may be dirty, may be contaminated, may carry a great variety of micro-organisms, harmless or harmful; but these stable foodstuffs can be disregarded for the most part by the bacteriologist, since they are, as a rule, washed and cooked, under circumstances which relieve the food control officer of much of the responsibility which he would otherwise bear. In this connection I am not forgetting the very excellent work which was done in Prof. Jordan's laboratory with reference to the difficulty of freeing contaminated lettuce and radishes from typhoid organisms by washing. The probability, however, of such contamination is so remote in the average run of stable samples that it would hardly pay a bacteriologist to examine for *B. typhosus* or *B. coli* as a routine matter.

But in dealing with perishable foodstuffs, the responsibility of the bacteriologist becomes acute, and since it is impossible for him to determine in detail what all of the significant organisms may be, adherence to the following principles is in my judgment the only solution of the problem. He needs first to know to what extent initial contamination of a product must be frankly admitted as unavoidable. He must also know the sources and general nature of possible contamination and he must know what amount of unavoidable contamination and what amount of bacterial increase through multiplication takes place in properly conducted channels of trade, and he must use this knowledge in interpreting his results. In other words, the responsibility of the control bacteriologist is to determine the bacteriological condition which may be shown by sound experiment to represent the proper handling of a product and to exact from the trade in handling human foods in as nearly such a condition as it is possible to obtain. Pasteurization, secondary cooking and other treatments must all be taken into account. But fundamentally, in all foods other than those intentionally fermented under controlled conditions in order to arrive at a preconceived and desired product, bacteria must be recog-

nized as contamination along with dirt, unavoidable perhaps, but to be reduced to an absolute minimum. When that absolute minimum still carries with it an element of danger, the bacteriologist must insist upon the practical destruction of even this absolute minimum. It is on this basis that the maximum allowable counts in different grades of milk as adapted by the New York Milk Commission was fixed, and it is upon the same basis that the maximum allowable bacterial counts have been worked out for other food substances, among which are notably water, egg products, processed meats, such as sausages or hamburger, oysters, various types of canned goods, and butter. From this list it is seen that the application of bacteriological methods, according to the conception which I have just given you has only been begun.

In addition to the quantitative determination of the number of bacteria allowable in various food products handled properly in trade channels in accordance with the principles of decency, it is possible for the control bacteriologist, even with the rush of work which is ordinarily imposed upon him, to make a few qualitative tests for bacteria which have been shown by the investigators to be of vital significance. In this connection, he may rely upon examinations for organisms which are found regularly as a part of filthy or polluted or decomposed substances, and may use the fact of their presence as presumptive evidence of such contamination or decomposition. And he may also rely upon the detection of organisms which, while themselves harmless, may point to sources of infection which carry the menace of disease germs. To illustrate, in the routine examination of oysters the bacteriologist need not search for *B. typhosus* or other sewage organism capable of producing disease, since the detection of *B. coli* is sufficient to show the product to be sewage polluted and a possible menace to health.

To summarize briefly what I have said, my conception is that the food control bacteriologist who must examine many samples a day of various products must rely upon the bacterial counts which have been found by careful experimentation to be the maximum allowable for any food material handled properly in the channels of trade, and should supplement this by the few qualitative tests which he can make of the most significant organisms which may be present.

NORTH CAROLINA SCHOOLHOUSE IMPROVEMENTS

If it were one of the old-fashioned patent medicine advertisers who presented these little pictures, they would be labelled, "Before and After Taking." They show the old Thompson schoolhouse in Rowan Co., N. C., and the new one. The old, ramshackle structure, built of logs hewn square and chinked, was good in its day, but that was long ago. In its present disrepair, with broken windows and leaky roof, it could have only a dispiriting influence on the pupils. Contrast it with the spruce, new building, with its high windows and air of cleanliness, and you will realize how North Carolina is beginning with the children in some of its steps forward.

POLLUTION OF DEEP WELLS AT LANSING, MICHIGAN

MAJOR EDWARD D. RICH,
State Sanitary Engineer, Lansing, Mich.

Read before Sanitary Engineering Section, American Public Health Association, at New Orleans, La., October 29, 1919

This story is out of the book of bitter experience. Sanitary engineers will be especially interested in the way in which germs found a passage the moment man relaxed his vigilance. The special lesson to be learned is that deep wells require the same watchful care as shallow ones.

LANSING, the capital city of Michigan, is situated about 50 miles south of the center of the southern peninsula. Its population is estimated at about 60,000, and its area is about 16 square miles, only about two-thirds of which is fully built up. The city has always been supplied with water taken from deep wells. There are 32 such wells in use at present, which vary from 350 to 400 feet in depth and take their supply from what is known as the "Coal Measure" sandstone. The rock formation is covered with from 20 to 100 feet of sand, gravel and mixed clay. Various strata are encountered between the bottom of the overlying earth and the water-bearing horizon. The wells are cased with iron pipe driven a short distance into the upper rock layers, but it is doubtful if these casings fit tight enough against the rock walls to exclude any seepage that might follow down along the casing. On account of the age of some of the wells it is possible that some of these casings have deteriorated enough to permit some leakage through the pipe itself. The casings vary in diameter from 8 to 20 inches and the present water consumption is about 8,000,000 gallons per 24 hours.

There are five separate stations pumping directly into the distribution mains. Central station is situated just east of the center of the city, Pennsylvania Ave. station is about a mile south of Central station, Seymour street station is about a mile and a quarter northwest of the Central station, Townsend street station is in the southwest part of the city, at the corner of Isaac and Townsend Sts., and Logan street station, the last constructed, is about a mile west and a little north of Central station. Originally, many of the wells flowed to a slight extent, but there was not sufficient head to furnish any great quantity of water, and pumps were installed. As the demands of the city grew and the pumping increased in volume, the ground water level receded to some extent and it became necessary to install deep well pumps at Central station to increase the yield. Logan street station being on higher ground than the rest was equipped with a triple stage deep well pump, electrically driven, when it was constructed. Pennsylvania avenue, Townsend street, and Seymour street stations are all pumped through horizontal suction mains connected to each of the wells. The length of the suction main at Pennsylvania avenue is about 3,500 feet, and at Townsend street about 1,000 feet, while the Seymour street line is considerably shorter. At each well a drop suction pipe extends down into the casing for about 20 feet, leaving an annular space of about half an inch between the pipe and the casing. The drop pipe is connected with the horizontal suction line by means of a "T" just above the top of the casing. The top of this "T" is tightly capped. Between the "T" and

the horizontal suction line there is a gate valve and a check valve.

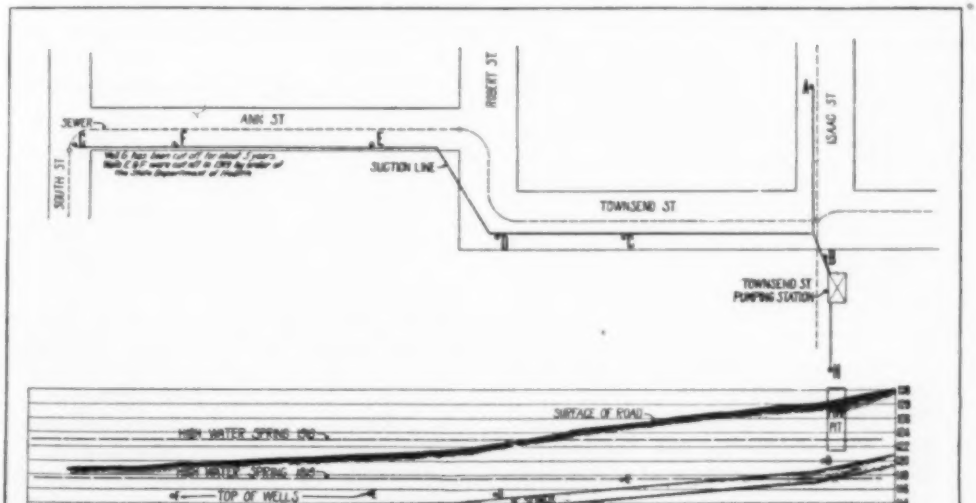
The growth of Lansing during the past five or ten years has been very rapid and it has been difficult to obtain enough water from the city wells to supply the rapidly increasing demands. Consequently, it has been necessary, on account of increased pumping, to maintain a heavy suction vacuum, particularly at Pennsylvania avenue and Townsend street. On account of the depth of the wells, they have always been considered pollution proof. For this reason, and also because in the early days the nature of the transmission of waterborne diseases was not clearly understood by waterworks officials, insufficient precautions were taken to make the joints at the top of the wells absolutely tight. In later years apprehension of the possible entrance of pollution has led to the use of more efficient pipe connections. This has been accomplished by means of flanges on both the drop pipe and the casing, with a rubber gasket securely bolted between them. This, of course, insures a water-tight joint if reasonably good workmanship is available. When some of the older wells were constructed it was attempted to obtain a water-tight joint by placing concrete arond the opening between the drop pipe and casing and extending it up a few inches to form the bottom of the valve chamber or manhole built over the well to give access to the valve. These valve chambers are not water-tight and particularly at the Pennsylvania station they have been regarded as a source of possible contamination, inasmuch as they are subject to flooding at times of high water from the Red Cedar River, which carries a considerable sewage flow from the eastern part of the city and from the city of East Lansing. It is believed, however, that most of the wells at the Pennsylvania station were constructed with flange and gasket joints. It has been customary to collect samples at this station whenever high water indicated the possibility of contamination, but only once or twice has anything suspicious been discovered.

The clearness of the water, the depth of the wells, and the absence of epidemics or serious illness all tended to create a false sense of security and led to a lack of that watchfulness which should always be maintained over every water supply. The upper layers of the rock are coarse, poorly cemented, and very liable to develop fissures capable of transferring laterally any pollution which might reach these openings through abandoned wells or other excavations deep enough to communicate with them.

Townsend street station is on Townsend street at the foot of Isaac street and only about 200 feet from the Grand River. Townsend street runs approximately parallel to the course of the river. In Townsend street and in Ann street, which is practically a continuation of Townsend street, there are five 6-inch wells connected to a single horizontal suction line about a thousand feet in length. Two other wells, one 10-inch, directly behind the station, and another 6-inch about 200 feet west of the station on Isaac street, complete the series of wells.

A sewer which serves quite a large portion of the southwestern part of the city extends along Townsend street and Ann street and lies only 10 or 15 feet from some of the wells. This sewer discharges directly into Grand River above the pumping station. During normal stages of the river this sewer has a free outlet and no excessive pressures are maintained in the pipe. At times of high water, however, the river rises to such height as to set back the sewage to a height above the tops of most of the wells connected with the Townsend street station. Under such circumstances, of course, this sewer is under hydraulic pressure, and the joints being far from tight, offer a ready means for sewage to percolate through the sandy soil into the

valve chambers. This pumping station has for a number of years been looked upon with a certain degree of suspicion and it has been customary to shut it off during high water stages. When this is done, the ground water rises nearly to the top of the casings, thus preventing an extensive amount of pollution from settling into the wells and reaching the lower level. But when the station is running and drawing heavily upon the wells there is a strong tendency to draw in polluted ground water through any leaks that might be present in the suction lines. Heavy rains caused the Grand River to rise 8 feet on March 15, 1919, reaching a river stage of 12 feet. This placed a static head of 2½ feet on the sewer at the wells forcing concentrated sewage into the sandy soil around them. Through an oversight, the station was not shut down at that time and the vacuum of 22 inches normally maintained pulled in such a quantity of highly polluted ground water that dysentery was epidemic by the 18th. The first complaint reached the State Department of Health from the Olds Motor Works, a large factory located about a quarter of a mile west of the Townsend street station, that a large number of their men were sick from bowel trouble. The department collected a sample of water and took action by ordering the station shut off at once. On the 20th a notice was published to boil all city water used for domestic purposes and the water department was directed to make the arrangements necessary for chlorinating the supply by means of the emergency machines furnished by the Department of Health. Systematic sampling of the supply at all the pumping stations and at various points on the distribution system was begun at once. Seymour street station alone showed safe results and has since continued to do so with one or two minor exceptions, all others being reported as unsafe or suspicious. On March 25th arrangements had been completed for chlorinating at the rate of 1.5 p. p. m. at Central and Pennsylvania stations. Continued flushing of dead ends was ordered and this, together with the chlorination,



resulted in sterilizing the water in the mains by the 29th. Chlorination has been maintained ever since.

On the 22nd the Townsend street wells were carefully inspected and a plainly audible leak was found at the top of well "C." There was also a poorly made and leaky shred-lead joint at well "D." A defective flange at the top of the casing of well "H" was also admitting surface water which, although some distance from the sewer, was probably polluted to some extent. All the other wells appeared to be tight. The old manholes were torn out and all the wells ordered repaired. This was done with standard flange couplings wherever possible. In some instances it was found impossible to lift the drop suction pipes for the purpose of fitting the flanges. In these cases the casings were cut off a few inches below the "T" and a poured lead joint about 6 inches deep was put into the annular space and thoroughly calked. There is no doubt that such a joint is fully as impervious as a flange coupling. Concrete manholes were ordered built at each of these wells.

After these repairs were completed samples taken from the Townsend street station, which had previously been connected so as to pump to waste for sampling purposes, showed continued gross pollution. It was attempted to obtain samples from the individual wells by shutting off all but one and pumping that in the usual way. This proved unsuccessful, however, due either to inability to shut the valves at the various wells absolutely tight or to the fact that the suction line and pump had become so seriously polluted as to communicate contamination to pure water, which might be drawn to the well being pumped. In order to study the individual behavior of each well sampling devices were installed at the top of each well between the "T" and the horizontal suction line. This made it possible to pump all the wells at the same time and to obtain samples from each before its output came in contact with that of the others.

After a series of about 75 samples had been collected from the individual wells the State Department of Health ordered on June 14th wells "E" and "F" permanently disconnected and plugged. Marked improvement in the quality of the water delivered by the Townsend street pump followed immediately and subsequent samples have indicated that the other wells have slowly returned to their normal state of purity.

The number of cases of dysentery which occurred during March and April is conservatively estimated at 3,000. The fact that dysentery is not a reportable disease in Michigan makes it impossible to obtain complete statistics of the number of cases. Dysentery was followed by an epidemic of about 82 cases of typhoid fever, with 11 deaths.

It is, of course, impossible to estimate the economic loss directly due to the pollution of the Lansing water supply, but some idea of its magnitude may be obtained from the following table showing the effect of the epidemic on the employees of the Olds Motor Works

EFFECT OF THE DYSENTERY EPIDEMIC ON OLDS MOTOR WORKS.

Date	Men Absent	Output Cars
March 19.....	171	138
20.....	418	88
21.....	1,703	19
22.....	2,100 (shut down)	0
23.....	Sunday	0
24.....	486	104
25.....	413	137
26.....	395	123

Normal production, 150 cars per day.
Loss of wages, $30,000.

The officials of the Reo Motor Car Co. report the average number of men absent from the factory March 20th to April 10th as 150. Loss of wages, $15,000. Estimated loss to the company, $40,000. This factory employs about the same number of men as the Olds Motor Works.

Chlorination has rendered the Lansing

city water supply safe for domestic purposes since April 1st. Systematic sampling several times each week was carried on until about August 1st, after which the interval between the collection of samples was considerably increased because no serious results had been found. The city has provided itself with chlorine machines and installed them at all stations except Seymour street, where the results of continued sampling justify its use without treatment. More than 800 samples of water were collected and analyzed during the course of the investigation. A chart has been prepared on the basis of these analyses showing the progress of the typhoid epidemic and the results of the tests, together with the stage of the river and record of rainfall for the entire period covered by the investigation.

The principal lesson we should learn from this epidemic is that deep wells situated in the midst of urban development require the same watchful care that would be accorded to a shallow well supply or to a surface supply known to be subject to periodical contamination, even though their depth and manner of construction would seem to preclude the necessity for such care. Assuming that such wells are constructed in the best manner possible, there are still three avenues by which dangerous pollution may suddenly gain access: 1. Deterioration in joints and piping. 2. Pumping in excess of the normal capacity of the wells tends to open the texture of the rock in the case of sandstone and to enlarge any fissures that may be present, and thus make the entrance of surface water seepage easier. 3. The careless abandonment of old wells penetrating the same water-bearing stratum, whether drilled for water, oil or salt, without plugging them tightly enough to exclude surface water.

It has been suggested that the state of Michigan pass a law requiring all such wells to be plugged. It is doubtful if such a law would be feasible. It might look effective on paper, but it would seem that its enforcement would be attended with many difficulties.

In the construction of deep wells there is certainly needed a better class of workmanship than is often obtained and a thorough inspection of all that is going on during the course of the drilling, for the purpose of ascertaining the exact amount of casing driven into the ground, and of collecting samples of all the materials passed through during the operation. It is quite likely that in many instances double casings should be used, the first reaching down as far as it is possible to drive it into the upper layers of the rock, and the second placed inside and extending to a depth sufficient to cut off all ground water likely to be subject to pollution. A water-tight packing should be placed between the bottom of the inner casing and the rock wall to accomplish this result.

The bitter experience of Lansing indicates that no matter how perfectly deep wells may be constructed and how remote their possibility of contamination may seem to be, it is a matter of the greatest importance that systematic sampling be carried on with sufficient frequency to detect any possible dangerous symptoms before they reach epidemic proportions.

Anyone familiar with milk production number of micro-organisms is reduced

STUDIES IN THE CLARIFICATION OF MILK

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Read before Joint Session of Sections on Public Health Administration, Laboratory and Food and Drugs, American Public Health Association, at New Orleans, La., October 29, 1919.

These studies were started during the summer of 1914 and have been continued in varying degrees since that time. They were made possible by the De Laval Separator Company of New York City, which established a fund placed in the hands of the Treasurer of the College to meet the expenses incurred.

The firm was desirous of knowing the truth about clarification, so far as it can be determined; accordingly, the work was placed on the usual basis of Experiment Station investigational undertakings with the enjoyment of complete independence. The firm has been a constant source of helpfulness and at no time has it attempted or interfered to influence results or the free publication of the findings.

I make this statement as a due appreciation of the helpfulness, generosity and sympathetic attitude of a commercial firm. If any commercial motive exists, it can be only a desire to have facts and truth as a basis for their procedure and progress in manufacture.

THE clarifier, as you know, is a centrifugal machine and is the result of an effort to establish a more effective device to accomplish that for which the separator has been used in a secondary capacity. The separation of cream by the separator, its primary function, could not be sacrificed to improve the "clarifier" or secondary function. The purpose of the clarifier is one of helpfulness in the purification of milk. As a machine, its efficiency is restricted only by the limitations of centrifugation as applied to milk.

Does it assist in the purification of milk? This question is the gist of what is involved in these investigations. If this machine does render the milk better, then we want to know how it does it and to what extent. Since it is a limited centrifugal mechanical device, all elements which may not be influenced by its centrifugation are eliminated from these studies.

Only conspicuous matters pertaining to clarification which may be of particular interest will be considered summarily. Other aspects will be published in the comparatively near future if not already published. Time and circumstances preclude exhaustive treatment at this moment.

1. *The clarifier strains the insoluble dirt out of milk much more effectively than any strainer now employed.*[1]

It is possible for dirt that is lighter than milk to pass through, but this has been noted only twice in our prolonged experience. Even when present in large amounts, only traces of such dirt can be detected. Of course, the clarifier, like the centrifuge, does not remove soluble dirt. Since the solubility of stable dirt from different sources varies from 10 to 30 per cent, the amount removed would vary from 70 to 90 per cent.

This, you will admit, has considerable material value and also great aesthetic value.

2. *The clarifier removes cellular elements or masses of cellular elements in a large degree.*[1]

The so-called leucocytes are removed in very large numbers, colostral cells almost completely, massed cells or garget completely, and any other cells incidental in milk in varying degrees.

*This is a summary of the laboratory work of E. G. Hood, S. G. Mutkekar, John Yesair and Max Marshall.

Anyone familiar with milk production realizes that a herd of twenty cows furnishes particles of garget in practically every milking, sometimes more and sometimes less. Garget suggests at once an udder disturbance somewhere in the herd which is not easily located. Whether or not garget or any massing of cells should lead to the isolation of cow or herd, we need not answer, for it is impracticable, perhaps impossible. The removal of all traces of garget is regarded as a real necessity. Colostral milk is much altered and can be improved and detected when desired. The excessive accumulations in the form of slime upon the bowl of the clarifier indicate at once abnormal conditions in the cow or herd.

The clarifier, therefore, removes clots or garget or any massing of cells; it modifies colostral milk and can be used to detect colostrum; it tends to eliminate all cellular elements. This is demanded by the public for aesthetic reasons and it may be that the removal of such substances does contribute to the real purity of milk. No one has furnished proof for this assumption, but we all admit that such eliminations are in the direction of improvement.

3. The clarifier removes micro-organisms in varying amounts, the larger more readily than the smaller.[1]

Too much has been made of the apparent increases of micro-organisms in market milk after passing through the clarifier. Those who know little about micro-organisms have taken the counts of bacteriologists, who have furnished them, and claimed that the clarifier actually increased the numbers. Such interpreters seem to have no conception of microbial development in milk and no knowledge of the crudities of plating. The milk passes the clarifier instantly. With certified fresh milk, where few colonies have developed, results diametrically opposed to market milk are obtained. It can be actually shown that the number of micro-organisms is reduced very materially even in market milk. The very evident facts that large numbers are found in slime, that 50 per cent and over can be demonstrated to be eliminated and that the increase cannot possibly take place while the milk is passing should be conclusive proof of the casting out of micro-organisms in large numbers. Again, if micro-organisms are in a very marked manner broken up when in colonies or clumps and if the numbers are not seriously increased, in fact, in certified milk are greatly reduced, then also we may conclude that very large numbers are thrown out. It appears, too, that when counts are made over a period of 72 hours at 2-hour intervals, the curves resulting from plate counts are practically identical even after the breaking up of clumps and colonies. We have charted these determinations to illustrate the real nature of clarification upon counts so much employed for interpretation. It is not justifiable to stop with a single count determination as is usually done.

While it is possible to say that there is no great difference in the time of alteration of clarified as against unclarified milk, it may be correctly asserted that the character of alteration is usually different and is in favor of clarified milk. This can be easily observed by comparison at suitable temperatures.

The releasing of individual organisms from their colony-involvement, which accounts for the apparent increase of numbers after clarification, seems to indicate that their individual physiological efficiency has been stimulated. Although increased, this efficiency serves as a directive force or produces the effect of a lactic starter in controlling the kind of fermentation, but does not hasten the time of action because of the reduction in numbers. This is readily demonstrated in a study of the clarifier when acting upon known organisms. Of three tests, the average of *Oidium lactis* re-

moved by the clarifier from milk was 99+%, of *Sacch. cerevisiæ* was 99+%, of *B. tumescens* was 63%, of *Strept. lacticus* 24%, of *B. prodigiosus* 23%. The smaller percentage of lactic organisms removed as against the larger percentage of *Ødium lactis, Sacch. cerevisiæ,* and B *tumescens* accounts for the ascendency of the lactic organisms and the lactic starter effect.

4. *If micro-organisms are removed and if milk still changes after clarification nearly as quickly as before clarification, it is necessary to justify the process of clarification from the standpoint of micro-organisms.*

This can be accomplished succinctly in the time available by simply indicating the evidence at hand.

a. When the two samples of milk, unclarified and clarified, are allowed to ferment side by side at a suitable temperature there is a noticeable difference in favor of clarified milk. The clarified milk trends more closely toward typical lactic acid fermentation while the unclarified milk will manifest obnoxious signs.

b. The curds removed by filtration undergo different changes: The unclarified will develop molds in abundance and putrid decomposition while the clarified will commonly have a more limited molding and non-odorous change or may even dry up without decomposition.

c. There is a difference in gas formation. Carbon dioxide develops in greater abundance in the clarified. The exact amount of total gas has not yet been measured. It has seemed to the workers that there is a greater amount of gas produced in the unclarified. This must be held in abeyance for proof with actual determinations of the total amount of gas.

d. Obnoxious odors were detected in the unclarified milk usually as against clarified. The flavor of the milk is usually improved by clarifying.

e. If allowed to stand for a time, *Ødium lactis* grows in abundance on the unclarified as against a few scattering colonies on the surface of the clarified.

f. Proteolysis is more marked in the unclarified as against the clarified.

g. Methylene blue is usually reduced more slowly by the clarified as against the unclarified milk.

h. The acidity is slightly increased by the clarified over the unclarified.

i. In the making of cheese the results seem to indicate that the flavor has been improved by clarification.

5. *If these observations are correct, an explanation is demanded. Why does clarification accomplish such results?*

My answer will not be complete for I suspect other reasons or elements beyond those I now give but which I cannot demonstrate positively at present or furnish satisfactory proof.

I align these reasons or factors entering into clarification in this manner:

a. Elimination. This has been discussed in connection with cellular elements, micro-organisms and dirt.

b. Selection. I have already shown how *O. lactis., Sacch. cerevisæ, B. tumescens,* are eliminated from milk by clarification in much larger percentage than *Strept. lacticus* and have suggested the result.

c. Association. This act of selection of heavier organisms over light disturbs the germ-equilibrium of the milk and directs or favors approved lactic fermentation through the changed association.

d. Distribution. The breaking up of colonies and the distribution of individual organisms throughout the milk acts like the shaking of a young culture of *Strept. lacticus* by stimulating activity, favoring lactic development along with the factors of selection and association.

e. Æration. This factor is present in the machine used by us and undoubtedly performs the same function as when employed with cultures.

From the investigations thus far completed and from the results indicated, there appear to be tangible values of practical significance in clarification. These values may possibly be increased. Our knowledge in the use of centrifugal force upon micro-organisms in milk is too youthful and too restricted to predict at this time its possibilities.

1. Bulletin No. 187, Massachusetts Agricultural Experimental Station.

SCHOOLS FOR HEALTH OFFICERS: WHAT HAS BEEN DONE AT SYRACUSE

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A RADICAL change has been effected in the administration of public health in New York state under the present Health Commissioner, Dr. Hermann M. Biggs, who has been able to put into effect the laws enacted by the State Legislature in 1913.

To appreciate what these changes have been, one must be familiar with the general conditions which prevailed under previous regulations. It is evident to all that the general health of the state depends principally upon the conditions existing in the health units, as represented by the various health districts, in the cities, towns and villages which make up the state.

When these new laws went into effect there were in the State of New York approximately 1,500 such units and there was no tangible connecting link between these units and the administrative body at Albany.

Each of these units had a health officer who was, to a certain extent, responsible for the health of his community, and the only contact which he had (with rare exceptions) with the State Department of Health was at the Annual Convention of Health Officers.

I was told by one health officer, when I questioned him as to his activities that he received practically no compensation for his services and there was little service required. The only reason he consented to serve was for the good time he had at these conventions.

The health officers in the various townships were usually appointed for their political activity or at the solicitation of some influential friend without regard to their qualifications for the position. His remuneration was in the hands of a board of health, which board was usually selected for complying with the law, with the least possible expense to the taxpayer —rather than from any knowledge which the members of the board may have had of constructive health work.

The health officer rarely, if ever, came in contact with his board. One of the health officers in my district had held the office of health officer for 30 years and had never met with his board of health.

The attitude of the board of health toward the health officer in the majority of the districts was that he should not receive compensation except when communicable disease was present during the year, and his compensation was in proportion to the amount of communicable disease, and the number of placards which he had posted.

The prevention of disease was too indefinite and intangible to receive consideration. Insofar as the board was concerned the health officer was most satisfactory who was willing to receive the criticism of the public and attend to his other duties with the least possible expense to the community.

He was regarded by the heads of families, many of whom were his private patients, as grossly incompetent if he did not keep a strict quarantine upon his neighbor's house when one of its inmates was afflicted with a communicable disease, and as an over-zealous official when he restricted their own liberties, under similar circumstances. It was, therefore, a great temptation to pursue the easier way of retaining the good will of the patients at the sacrifice of his duties as a health officer. As a result, a premium was placed upon inefficiency and a penalty for doing his duty properly.

Were it not for the high sense of duty which is possessed by most of the members of our profession, conditions would have been much worse than what we found them.

An intimate association with rural health officers has (with few exceptions) given me a high appreciation of their sturdiness of character and conscientious work, under most trying conditions.

As an instructor and co-worker, I have never known men, taken, as a whole, who were more eager to improve their knowledge or more appreciative of efforts made in behalf of their municipalities; and their inspiration under the present administration has not come so much from the increased remuneration which the law has determined by fixing a minimum per capita salary, as from the moral support and encouragement which they have received through the state sanitary supervisors and the heads of the various divisions of the State Health Department, as now constituted.

No matter how conscientious a public health worker may be, his enthusiasm soon wanes when he becomes conscious that his work is not appreciated by his community. Indifference of his associates is a great handicap to good work.

To a health officer who is not interested in his work, the salary is the chief consideration—but a health worker who regulates his efficiency from the standpoint of salary and his attention is fixed upon the clock rather than his results, will never be of any great value to his community in public health work.

The above were in general the conditions which the sanitary supervisor found in New York state when he entered upon his duties early in the year 1914. The proposition which confronted the health commissioner was how can they be remedied?

The State Health Department first secured through the legislature the enactment of a law which fixed a minimum per capita salary for all districts with a population of 8,000 or less.

On July 6, 1915, the New York State Public Health Council passed a resolution requiring certain qualifications as necessary to the appointment of a health officer, by the local boards of health throughout the state. These regulations took effect on June 1, 1916.

Two courses were prescribed for the purpose of fitting them for these requirements. One course was a residence course of six weeks in connection with a recognized university. The alternative was a reading course extending over a period of one year with one week's residence, in connection with a recognized university.

From my knowledge of the conditions in the district over which I had jurisdiction, I felt that I would have difficulty in bringing my health officers to the required standard of efficiency by either of these courses.

My principal reason was that these health officers needed to be brought into more intimate association with their sanitary supervisor in order to secure the enthusiasm necessary for the work.

Under the old environment, the men had become self-satisfied and discouraged. They needed to be lifted out of themselves and to be thrown more frequently into contact with those with similar occupations and purposes.

The opportunities for social intercourse and contact are not numerous in the smaller rural communities, and excellent men have gradually lost faith in themselves and their incentive for work has waned through the lack of opportunity to associate with those of similar environment. I consider that one of the great advantages which the Health Officers' Course at Syracuse offers is that it brings these men from various communities together each week to exchange their ideas and for social contact.

With these principles in mind, I asked and was granted the privilege by the Public Health Council of substituting in connection with Syracuse University the course which I will briefly outline.

This course consists of intimately combining reading and residence work over a period of 12 weeks. A tentative program is sent to the men who enter the class about 6 weeks before the course opens. When the course is under way a program is furnished every week to each member of the class, designating the work to be taken up for that week, to enable him to do some reading in advance. The class convenes in Syracuse every Friday and Saturday of each week for the entire period of the course, and the program, as outlined, is put into effect by means of lectures, demonstrations, clinics and actual participation in the work.

This work is made as practical as is possible and covers the subjects that the men must meet most frequently in their own communities. For this purpose teachers are drawn from the Faculty of the University, the municipal officers whose work touches upon Health Problems, the various local laboratories, dispensaries, the hospitals, including the County Hospital for Tuberculosis, City Hospital for Communicable Diseases, State Institution for Feeble Minded, industrial institutions, public schools, water and public works departments, milk pasteurizing plants, child welfare stations and, in fact, all facilities which bear upon public health directly or indirectly.

The object is not to fit men to specialize in any one branch of public health work, but to give them a broad idea of the significance of public health activity in its various branches.

Sir Arthur Newsholme expresses his ideas of the purpose of public health work in the following sentence: "It is to secure the maximum attainable health for every member of the community."

Our object is to give the health officer a knowledge of this work that will inspire confidence in himself and in those about him. The health officer should be regarded by his community as a specialist in public health and hygiene. In order to meet the dignity of his position his knowledge of public health subjects should be broad and comprehensive. His selection to office should be made solely in regard to his fitness for the position. His duties should not be the perfunctory

Health Officers' Class at Syracuse University.

one of a sanitary policeman who is often regarded by the public as worse than the diseases he quarantines.

The health officer should be entrusted with the giving of instructions as to the methods to be adopted in preventing the spreading of disease, a function which the family physician too frequently assumes. The attending physician should seek the health officer's advice in matters pertaining to health regulations in the same spirit which he would that of the consulting surgeon or internist.

Through a better knowledge of his specialty the work of the health officer should impress itself upon the municipality in a manner sufficient to command coöperation and assistance from all societies and organizations in his community. His visits to the afflicted home should be looked upon as that of a wise counsellor and friend and not of a heartless official to be dreaded. This will ensure more prompt reporting of disease.

To secure such a recognition the health officer must possess certain qualifications of character and education which will command the respect of the entire community. He should be prepared to answer promptly and intelligently all questions relating to the fundamental principles underlying public health work, when such questions are asked by the local physicians. His knowledge of epidemiology should be sufficient to enable him to meet effectually all outbreaks of disease and as far as possible to trace them to their sources.

The question naturally arises, "How can the health officer secure such qualifications without too great a sacrifice of time and money?" When we consider the meagerness of his salary in proportion to the income from private practice, we are but little surprised at the common query by him "How can I afford to do it?"

We must furnish him a course which will afford him these opportunities with the least possible loss of time from his regular practice. It must be of such a character that its teachings will be of the highest value to him as a practitioner in medical lines which are so closely allied to public health work. Our aim should be to open up to him the broader fields which he can cultivate and supplement by future reading.

It would require years of training to qualify him as a specialist in bacteriology, but he can be taught the fundamental principles of laboratory work and laboratory methods, which will enable him to appreciate their limitations and the wonderful assistance to be obtained from them when properly understood. He should, in a general way, know the principles which govern the growth and propagation of bacteria, something of their morphology, selective staining, and the difficulties encountered by the bacteriologists when specimens are improperly collected, tabulated and dispatched to his laboratory.

He should have some knowledge of the methods used in isolating pure cultures and for what purposes they are isolated. He should know what is meant by "dark field illumination" in the diagnosis of certain diseases; the principles underlying agglutination tests and complement fixation and the methods of ascertaining the various types of pneumonia for the purpose of serum treatment. He should understand some of the underlying principles of immunity, both active and passive, and the great value of immune sera when administered properly. He should understand in a general way the phenomena of anaphylaxis and the dangers of administering large amounts of foreign proteins without suitable precautions.

He should have some knowledge of vaccine therapy and its limitations. He should understand the difference between vaccines and immune sera. He should have a general knowledge of the production of diphtheria anti-toxin, its standardization, dosage, and administration.

under varying conditions; should know how Vincent's angina can be distinguished from diphtheria; what is meant by the "Schick test" and see its application; should have a general idea of the toxin-anti-toxin method of immunization against diphtheria. He should be shown how to secure blood for the Wassermann test, and other similar reactions, and have a knowledge of spinal puncture and its importance as a diagnostic and therapeutic measure in certain meningeal affections. To my mind, this knowledge of these various phenomena cannot be obtained without practical demonstrations and an intimate association with his teachers.

To teach this work effectually the class must be limited in numbers and must have teachers who have the enthusiasm and personality which will bring out the difficult points through questioning, explanations and clear demonstrations.

The same practical methods should be used in other phases of the work. Practical demonstrations should be given in the early diagnosis of tuberculosis by the best specialists obtainable in this line of work. He should be shown that sanitarium treatment for this disease should be both educational and for the arrest of the progress of the disease.

He should be familiar with the treatment of venereal diseases and have practical demonstrations in the administration of remedies, and so far as possible be taught the technique of intravenous therapy, by actual demonstration. The same practical methods should be used in demonstrating school examinations, school inspection and the problems underlying its various branches.

He should be shown open air schools in operation. Should be taught the value of substituting industrial teaching for atypical and backward pupils. He should be taught industrial hygiene particularly as applied to foods; should visit certified dairies, pasteurization plants, ice cream factories, and should be shown the methods used in scoring dairies by men of experience. He should visit hospitals for communicable diseases and observe these diseases in their various manifestations throughout their course. He should be taught the rôle of the carrier in the spread of disease and how best to protect the public from them with the least amount of hardship to the afflicted family. He should be taught the various methods of the purification of water for municipal purposes, including chlorination, mechanical and slow sand filtration, should visit sewage disposal plants in operation and the various other municipal health activities, and should be given practical demonstration in prenatal care and infant welfare work. He must realize the value of vital statistics and the general laws governing his activities and should be well drilled in the requirements of the sanitary code.

The question naturally arises in one's mind "Is all this possible in so short a course?" Without enthusiasm, coöperation and a determination to succeed would be impossible.

If you can secure a corps of instructors with enthusiasm for the work and who can inspire their men with the highest ideals, it is possible.

A spirit of coöperation has been stimulated to a high degree and the men so trained are having their field of work gradually extended through the consolidation of districts and the demonstration of their superior fitness for the work. Other schools in New York state have been recently developed along these lines.

We fully realize that the ideal toward which we are working can only be accomplished by the securing of well-paid full-time health officers. But until we can create public sentiment and an appreciation by physicians of the great importance of preventive medicine, we must use the material at hand, not only in order to meet our present health situation, but to stimulate the public to a higher appreciation of this work.

THE INSURANCE COMPANY IN INDUSTRIAL HYGIENE

A. D. REILEY,

Assistant Inspector of Risks, Mutual Life Insurance Co., New York City.

Read before Section on Industrial Hygiene, American Public Health Association, at New Orleans, La., October 30, 1919.

We are all cognizant of the work that has been performed by the insurance companies of this country in starting, fostering and giving impetus to the safety movement. I think it not too much to say that the institution of insurance is entitled to more credit than any other force operating toward the ultimate success of that great movement.

This work was carried on almost wholly by the accident companies and those doing employers' liability and workmen's compensation insurance. The systems inaugurated by them and giving a specified rebate on the premium for each safety device and guarded machine; the willing assistance rendered by their engineers to all plants which wished to advance the safety-first movement; the industrial work of their rating boards and the yeoman service rendered in their backing of the great safety organizations, such as the National Safety Council and the American Museum of Safety, cannot be too highly commended. It is perfectly true that the lessening of industrial accidents meant thousands of dollars saving to them; but it is also true that good working conditions undoubtedly return a profit to the plant possessing them and I have never heard the mead of praise denied to the plant on that account.

During the war the insurance companies were one of the government's most efficient aids in working out the protection of the great munition producing plants, both from the standpoint of physical protection of the property and the lives of the workers. They supplied a great part of the trained personnel necessary to this work and did a great part of it direct from their offices.

Thus far the companies have not done nearly the amount of work in industrial hygiene that they have in safety. Some things they have done it is true. In certain cases they have acted in the capacity of expert adviser on industrial conditions to the plant management and have rendered excellent service, but their work in this line has been in the main incidental and has not left its impress on industry with any particular force.

It must be admitted that, in the main, the great life insurance companies have not contributed to the betterment of working conditions in industry to any very great extent. It is true that many valuable studies of industrial mortality have been contributed, mostly by the industrial companies, but life insurance has done almost no direct work of consequence in this field.

It is of comparatively recent date that the old line companies have waked up to the value of a scientific industrial selection. Twenty years ago industrial selection in life insurance was a rather perfunctory affair. There were various occupations known to be dangerous which were on prohibited lists, and men engaged in these occupations could not procure insurance at any price. These were, for the most part, occupations of accident hazard and, in life insurance circles in general, very little was known of the great trade poisons.

During the past ten years an increasing feeling that it is the duty of a life insurance company to cover by its protection as many lives as possible has induced the wiping out of many of the occupational restrictions; the opening of many industries to insurance which had hitherto been closed, and the search on the part of the companies for material and data on which to base the rates charged for dangerous and unhealthy

employment. This growth of a broader idea in insurance; the spread of an insurance propaganda to the effect that every man engaged in a useful occupation who wishes to buy straight insurance protection should find a market where he can purchase at a rate commensurate with the actual cost, has forced life insurance companies to investigate industrial hazards with a steadily increasing interest. As yet this movement is in its infancy; but we in the business can see it gathering momentum from year to year and showing itself largely in the studies of industrial mortality which life insurance men are publishing with increasing frequency.

There are forces operating now in the insurance and industrial worlds which will in the end compel both the accident and workmen's compensation group of companies and the industrial and old line life group to do more and more work in industrial hygiene. Both groups have a capacity for usefulness in this field which we cannot overestimate and which will be a tremendous power for improvement when in active operation.

industrial movement, with which we are all familiar, toward better general working conditions. I think we can say that the Great War or possibly the curtailing of the world's labor supply, owing to the losses sustained in the war, have united the safety-first idea and the work for improvement in industrial hygiene into one great movement which can be called "the conservation of industrial man power." The U. S. Government felt the necessity for this work keenly during the war and gave the movement its hearty support, and to those of us who have been intimately connected with it, it is one of the most important problems of the day. Insurance as an institution is woven so deeply into the fabric of trade that companies must look beyond the mere question of dollars and cents and proceed on the basis that, with an institution so necessary to the public good, whatever benefits the public will benefit it. I know that no life insurance underwriter can deal with the problems of industrial selection without feeling keenly the opportunity and an intense desire to co-operate in this really great work.

The payment of compensation for industrial diseases talked of in a number of states, and attempted in a timid, faltering manner in one, will be an accomplished fact of the industrial future. When that comes, if not before, the companies dealing in that type of insurance will meet the situation as they have met the accident situation, with skill and efficiency, and a tremendous aid in the final solution of the problem will have been enlisted.

I do not, however, feel competent to speak of the part taken, and to be taken, by this group of companies. It is of the life insurance companies and their work to which, as a life insurance man, I must confine myself.

There are, speaking generally, two methods of selecting a life insurance risk from the industrial standpoint. These are the individual method and the class method. In the latter, the mortality experience of the industry is procured as nearly as possible from the whole country, and a general rate imposed on the hazardous jobs which is the same for all similar operatives in all similar factories. By the individual method, some means is used for charging a different rate for selected risks. By a selected risk is meant one which is employed in a plant which takes care of its problems of safety and health in a skillful and painstaking way.

As a concrete instance, take a plant handling a trade poison. The company insuring an operative in that plant, if it proceeds on the individual method, may have three rates which it can charge the operative; say $5, $7.50 or $10 per $1,000 of insurance in addition to the usual premium. If the plant is well equipped with mechanical devices for dust and fume removal; has its dangerous pro-

cesses properly isolated; furnishes ample means for personal sanitation; provides clean and healthful rooms in which meals may be eaten; in short, conducts its operations in a manner which shows it is keenly alive to the dangers of its work, and the operative himself has an intelligent comprehension of the hazards of his trade and a desire to guard himself against them, the low rate can be charged with confidence even though it be lower than demanded by the general mortality in the class. It may be charged against this plan that on account of the floating character of labor we have no guarantee that an operative will not leave a plant in which he obtains a policy with a low extra and go to work in one where conditions are such that a much higher rate should be charged. This is, of course, true, but all those who have studied industrial conditions have often commented on the fact that there is a direct relation between working conditions and labor turnover, and the plant which has the worst conditions will invariably have the highest turnover. Consequently what self selection there is, is generally in favor of the company, more risks proceeding from unfavorable to favorable factories than the reverse. This method forces the company employing it to make a careful study of all industries whose operatives they wish to insure; to watch the trend of conditions in an industry and to make careful investigations of all hazards involved. I have known manufacturers frequently to evince a great interest in the rate at which their employees could buy insurance and ask if certain changes would enable them to procure insurance at a lower rate. The educational advantage to the workman himself is also great as, if he sees himself able to procure insurance at a lower rate because of the excellent condition of the plant in which he works, the importance of good working conditions is emphasized as it could be in no other way.

During the last few years it has been the universal practice of life insurance companies to place upon policies issued to selected lives certain special benefit clauses. These clauses usually take three forms; the double indemnity, the disability benefits and the waiver of premium. The first of these need not be discussed at length. It provides for the payment of double the face of the policy in the event of accidental death. As the selection of lives to receive this benefit deals only with the chance of traumatism we may dismiss it. The disability benefits clause provides that in the event of the insured becoming totally and permanently disabled by reason of disease or bodily injury the company will waive all subsequent premiums and pay the insured a sum equal to 10 per cent of the face of the policy until his death, recovery, or the earlier maturity of the policy, as in the endowment form. Up to the present time most of the adverse experience from this feature of the policy has been due to three causes, syphilis, tuberculosis and insanity. Whether the unhealthy trades will contribute their quota to this we do not know, as men engaged in such pursuits have not generally been given the clause. But with the necessary extension of all features of life insurance to all classes it will be necessary to make intensive studies of all unhealthful industries before extending the protection of the clause to their operatives.

Presumably the great hazard will come in the dusty trades through their predisposition toward tuberculosis; and the difficulty of ascertaining the experience in such trades because of the drifting character of labor has often been pointed out. This is, of course, dipping into the realm of accident and health insurance, but this overlapping tendency is going on through all lines of insurance. At least one life insurance company is, at the present time, issuing what it terms a complete protection policy. This insures life, accident and health all under

one cover. It is very doubtful whether that tendency will spread very far among the old line companies, but it is undoubted that they will be under the necessity of proceeding further in industrial health research under the present policies issued than under the old.

While all these various movements and changes in the life insurance business have this drift toward a more scientific industrial selection, it is undoubtedly the group insurance plan which will produce the most work and the greatest direct benefit to industry from the standpoint of industrial hygiene of all life insurance efforts. You are all probably familiar with this form of insurance, but for the sake of continuity I will outline it briefly. Group insurance provides for the insurance, by a plant, of all its operatives without medical examination. The plan, originally designed to protect against death only, now has been broadened to include health also and certain companies are issuing group life and group health insurance in large volume.

It will be immediately seen that the opportunity for constructive work in studying and improving industrial conditions offered to a company doing this type of insurance is enormous. It can probably be best illustrated by stating briefly how one great company tackled the problem. My description of their method must be very general as it is not my company and the details of their system are not at my fingers' ends.

This company has established a bureau composed of skilled industrial men, whose duty it is to study each problem presented on the ground, and not only to give their opinion as to conditions and recommend the rate to be charged, but to work actively with the plant management in instituting improvements in safety and sanitation. They will go to the extent, if it is desired, of organizing completely the employment management department in the plant; recognizing that, after all, the key to the situation lies in scientific employment management. Of course, as a business proposition this method speaks for itself and practically all companies who do group insurance will be compelled by the stern spur of competition to follow it, even though they might not have done so if left to themselves. If all life insurance companies did group insurance I think there is no doubt that the work done in industrial hygiene by the life companies would be the most important in the field. The number of companies that are operating is constantly increasing and excellent results have already been obtained in many instances.

I have been endeavoring to show in the brief space alloted to me that although life insurance companies on the whole have not realized their opportunities in the work for improvement of industrial conditions, the drift is ever in the direction of increasing interest.

It is also being made gradually more apparent that the importance of environmental and industrial selection has not in the history of life insurance been fully recognized. According to the ancient and time-honored methods, a risk was practically selected on the medical examination only and its value was practically determined by its physical condition. Modern opinion and knowledge have determined conclusively that the value of a life insurance examination has wholly evaporated at the end of about a five-year period or slightly longer, and from then on the lives are on a community basis. Selection from the industrial and environmental standpoint lasts generally through the entire lifetime of the policy and thus has a continuing value as long as the risk remains on the books.

We who are working constantly on this phase of the insurance business are anxious for the day to dawn when the mighty institution of insurance places its whole weight to the wheel in the solution of this mighty problem.

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THE PROBLEM OF THE HEALTH OFFICER'S SALARY.

The Medical Officer for Dec. 6, 1919, contains a memorandum submitted by a special committee of the Society of Medical Officers of Health of Great Britain, formally adopted by the Council of the Society November 21, 1919, which is of great interest to public health workers in this country as well as in England. Its subject is the remuneration of public health officials and the argument which it presents in favor of a standardization of salaries, and of material increase in salaries, is of world-wide application.

The memorandum points out two principal reasons for an increase in the scale of remuneration for health officials. The first is the rise in the price level which as we are all aware in this country has made the purchasing power of the dollar about one-half of what it was five years ago. This argument, of course, applies to all salaried employees. There is another special argument for the increase of the salaries of health officers which depends on the vastly increased responsibilities which are being placed upon such officers year by year. The memorandum in question speaks of the fact that a minimum commencing salary of 500£ for a whole-time medical officer of health was fixed by the Medical Officer in 1912. "It is since that date," the memorandum continues, "that the responsibilities of a medical officer of health have enormously increased and the character and scope of the work materially altered. The work of a medical officer of health becomes more and more medical in character and is now concerned with the individual at least as much as with the environment of the individual. The old and artificial boundary between preventive and curative medicine is rapidly disappearing, and every session of Parliament throws new work upon the medical officer of health, requiring of him a wide knowledge of medicine and its latest ramifications, administrative ability of a high order, and the exercise of first class powers of conception and initiation in the development of the health work of local authorities.

Since 1912 the majority of schemes for the treatment of school children, including the establishment of clinics and dispensaries, have been instituted, and propaganda campaigns inaugurated in connection with various health subjects of national interest and importance."

As a result of these considerations the Society of the Medical Officers of Health recommended the salary scale indicated below, and voted to forward it with its approval to the British Medical Association, and to ask that a joint standing committee of the British Medical Association and the Society of the Medical Officers of Health in equal numbers be formed to take charge of the case for improvement in the salaries of medical officers; and that the Ministry of Health be approached with a view to giving effect to the scale of salaries in question.

RECOMMENDATIONS.

I. WHOLE-TIME MEDICAL OFFICERS.

1. That the tabulated scales of minimum salaries below be approved.
2. That the following scales of minimum salaries be subject to bonus according to the Civil Service award in force for the time being.
3. That the following scales of minimum salaries represent inclusive salaries and the value of the whole-time service of medical officers in the various classes indicated.

Minimum Salaries of Whole-Time Resident Medical Officers, Medical Officers, Medical Officers in Charge and Assistant Medical Officers of Health.

	Minimum Salaries	
Resident medical officers in hospitals and sanatoria	350 £ ($1750*) (including board, lodging and washing.	
Medical officers *employed in* School medical departments, Tuberculosis departments, Mental deficiency departments, Maternity and child welfare departments, Venereal disease departments, or any other similar department or combination of departments.	500£ rising to 750£ per annum within a period of not more than 10 years ($2500 to $3750).	With in addition bonus according to the Civil Service award in force for the time being.
Medical officers *in charge of* School medical departments, Tuberculosis departments, Mental deficiency departments, Maternity and child welfare departments, Venereal disease departments, Hospitals, Sanatoria, or any other similar department or combination of departments. Assistant medical officers of health employed in the administrative *work of a medical officer of health.*	700£ rising to 900£ per annum within a period of not more than 8 years. ($3500 to $4500).	

*Figured approximately at normal pre-war rates of exchange.

Minimum Salaries of Whole-Time Medical Officers of Health.

Population of area	Minimum salaries
Up to 50,000	800£, rising to 1,000 ($4000 to $5000) pounds within a period of not more than 5 years.
50,001 to 100,000	1,000£, rising to 1,200 ($5000 to $6000) pounds within a period of not more than 5 years.
100,001 to 200,000	1,200£, rising to 1,500 ($6000 to $7500) pounds within a period of not more than 5 years.
200,001 to 300,000	1,500£, rising to 1,800 ($7500 to $9000) pounds within a period of not more than 5 years.
Over 500,000	1,800£ ($9000) with in addition bonus according to the Civil Service award in force for the time being.

II. PART-TIME MEDICAL OFFICERS.

4. That part-time medical officers of health be paid at the rate of 4£ 4 s. ($21.) per day according to the time devoted to their duties, subject to a minimum payment of 100£ ($500) per annum.

5. That part-time specialist officers be paid at the rate of 1£ 11 s. 6d. ($7.87) per hour subject to a minimum payment of 2 pounds 2 s. ($10.50) for any session.

It is interesting to note in this connection that the Engineering Council, in this country has appointed several committees on the classification and compensation of engineers, and that a recent report issued under date of November 11 from the office of the Council, 29 West 39th St., New York City, has presented with admirable clearness the need for better classification and more adequate compensation of the engineers in the service of the Federal Government. The following recommendations made by the committee are as applicable to public health as to engineering:

1. Positions should be classified in accordance with the character of the duties to be performed and with the training and experience necessary for their performance, as indicated by a system of grading.

2. Within the salary limits fixed for each grade, there should be a system of advancement through the grade based upon experience gained in the position and upon proof of increase in the proficiency of the employee in performing the duties of the grade.

3. Promotions from grade to grade should depend upon the existence of a vacancy in the higher grade and proof that the employee is qualified to fill the vacancy.

4. The determination of adequate salary schedules should take into account and properly weigh the following considerations:

(a) The capital invested, both in money and in time, in obtaining the requisite fundamental training.

(b) The amount and character of experience and the degree of personal ability required.

(c) The relative value of the classes of work to be performed.

(d) The amount paid for similar work in private employment.

(e) The amount necessary to enable the employee to maintain a standard of living commensurate with the general standards of the community for positions of similar dignity and responsibility.

(f) The amount necessary to procure for and retain in the Government service a class of employees capable of conducting the business of the

Government with an efficiency and a spirit of initiative equal to that of private business.

5. In the interest of an adequate social policy, no position likely to be occupied by individuals of an age to assume family responsibilities should fail to pay an amount sufficient to permit the maintenance of the average family in reasonable decency and comfort.

6. In the interest of the employees as a whole and of the proper conduct of the work of the Government, a system should be established by which employees who fail to maintain satisfactory standards of service should be removed, transferred, demoted, or retired as may be equitable in the circumstances.

The definite scale of salaries suggested by the Engineering Council for Federal engineering employees ranges from a minimum to $1,620 for a junior assistant engineer to a minimum salary of $8,100 for a chief engineer, the time taken in passing from the first to the last grade being assumed to be 14 years. Since the training adequate for a competent public health official is longer and more arduous than that of the engineer it would be proper to fix a higher minimum rate for junior positions than that specified above. The report of the Engineering Council and the action of the British Society of Medical Officers of Health should serve as an inspiration to public health workers in this country, and particularly to the American Public Health Association, to take this matter up in a definite way and to make a serious effort to standardize the salaries of public health workers and to raise them to a level sufficient to insure the type of service which the community demands and deserves.

Governor Alfred E. Smith of New York state, in his inaugural address, delivered June 7, has well said:

"The state can make no more profitable expenditure than that wisely made in public health education and in advancing public health administration. It is essential for future progress that the careers open to physicians in the public health service should be made attractive and that the compensation of health officials of all kinds should be more nearly adequate to the service which they should be required to render to the public. In this way only can the best qualified men be attracted to the service and the best results for the state be attained."

C.-E. A. WINSLOW.

PRINCIPLES OF PREVENTION.

The experiment made jointly by the U. S. Public Health Service and the Bureau of Medicine and Surgery, Navy Department, during the pandemic of influenza, in an effort to determine the method of spread of that disease, gave results which furnish much food for thought. Acting upon the hypothesis that influenza is communicated from the sick to the well through transference of discharges from the throat and nose, the noses and throats of a large number of healthy, presumably non-immune, enlisted men of the Navy, were sprayed with fresh moist material from the throats and noses of influenza patients in all stages of the disease. The material was also swallowed and inoculated subcutaneously. Not one of the volunteers experimented upon developed influenza.

So far as we know this is the only instance where experiments on a large scale have been carried on in a disease of the respiratory type, using man as the subject of experimentation. Positive results were expected. That they were negative was disconcerting, but the theory that mouth and nose discharges carry

dangerous and infective material was not disproved. On the contrary, negative results only brought us to a realization that there are many other, but little understood, epidemiological factors to be taken into consideration, apart from the mere transfer of infective discharges, which determine the occurrence either of a single case or many cases of a given disease. Certain physico-chemical phenomena are involved and these include the state of individual immunity, which varies from time to time; the varying aggressive power of the microorganism; symbiotic condition, etc. Be that as it may, the transfer of infectious material is necessary before disease can develop even in those who are otherwise ripe for infection.

The transfer of discharges from the mouth and nose may take place in many and devious ways; the material is often given off in minute particles which are invisible, and it is discharged frequently, unexpectedly, unknowingly and promiscuously, making it impossible for a health officer to erect effective barriers. In practice it would seem that in spite of efforts on the part of health authorities, diseases like measles, scarlet fever, tuberculosis and kindred affections, go onward through their endemic and epidemic cycles governed only by the laws of nature which man so far has been unable to determine. Certainly isolation, quarantine and disinfection applied to a community do not seem to have had much effect. Success in prevention must lie with the individual and it is, therefore, one of the most important duties of a health department to educate the public so that every person may be able to do all in his power to protect himself and his neighbor. Education must commence in the schools and results may be hoped for along these lines from the coming generation.

There are, however, some diseases in which epidemiological studies have pointed out methods of prevention that are certain in their results. Such barriers to the spread of disease may be immunologic barriers, Nature's method, or they may be artificial, devised by man. Where immunity is induced as in smallpox and vaccination, Nature's method of prevention is utilized; in diseases which are carried by insects and those spread through intestinal discharges, purely artincial methods are especially useful. With regard to the former it may be said that "No Anopheles mosquitoes—no malaria" and "No Stegomyia mosquitoes—no yellow fever" are slogans which have been proved repeatedly. Of diseases of the intestinal type, it may be said that well recognized preventive measures, logically applied, will reduce the amount of typhoid fever and other maladies of the group to a negligible quantity. In these so-called "filth" borne diseases, the ways in which infectious material is disseminated, are not so numerous or varied as in diseases of the respiratory type. Defecation is an act which is definitely limited as to time and place; the discharge is gross and visible. The health officer himself can establish the conditions under which it is to take place, thereby reducing to a minimum the danger of disseminating infection.

To sum up, it would seem from the standpoint of health department activities and expenditures, that the communicable diseases might be placed in two great groups; those the control of which depends mainly upon education and individual effort and those in which preventive measures depend mainly upon education and community effort. In either case education is the foundation upon which all preventive measures must be built.

BOOKS AND REPORTS REVIEWED

Hygiene and Sanitation. *Seneca Egbert, A.M., M.D., Professor of Hygiene, University of Pennsylvania. Philadelphia and New York: Lea and Febiger. 1919. Pp. 554. Price $3.00.*

This is the seventh edition of an old standby. The last edition has been revised and much new material added, especially on sewage disposal, industrial hygiene, and military hygiene. It is difficult in these days of rapid progress, however, to revise a book on this subject without practically rewriting it. In this one there are many obvious and abrupt transitions from old ideas to new and the book is tinged throughout with obsolete theories. A section entitled "Diseases caused by impure air" seems out of place in a modern text book. Houseplumbing and disinfection are given more space than they are worth. There is no description of purification of water by liquid chlorine, nor of standard methods of analysis. The illustrations are occasionally antiquated and the references are absolutely not up to date. For instance, though many references are cited in the chapter on Sewage Disposal, no mention is made of Metcalf and Eddy's books, nor of Fuller's, and in the chapter on Industrial Hygiene, Price and Thompson are ignored. As a manual of general fundamental principles, this book is valuable, but for the person who desires information of an advanced character, it would seem to be too conservative.

JAMES A. TOBEY.

✣

The Health of the Teacher. *William Estabrook Chancellor, Chicago: Forbes & Company. Pp. 307. Price $1.25.*

In modern plannings by public health officers the health of the children stands as one of the most important features. Further than this, health education in which the children to a very considerable degree are to be the instructors of their parents is an important consideration in the public schools. The plan is a philosophical one to teach children the fundamental facts in health and hygiene in the same institutions and by the same methods whereby they are taught reading, writing, grammar and geography. The value of such teaching is patent to every one who will bestow a moment's thought on the problems of the health administration of today. There has been lacking here, however, the preliminary training on the part of the teacher to fit her for her part in such a program.

Dr. Chancellor's volume comes in here to fill the gap, to teach the teacher, and to make it easy for her to instruct her scholars in the rudiments of health. The foundation principle is, of course, that the teacher of health should herself be healthy. This little book makes that practicable for her, for it tells how to keep in perfect health and at the highest point of efficiency. From cover to cover it is filled with cogent statements, and what it has to say is phrased in plain, unmistakable terms. "The body is a chemical laboratory whose output is life-and-death, force-and-pain, strength-and-weakness. It has come to pass that 98.5° registers the correct point for these chemical processes." "Human life is a flame as of gasses that burn into 'mind' at a temperature within one or two degrees of 98.5°; varying much from which the flame dies."

Hundreds of topics of interest are brought out for brief consideration, all of them of consequence in health education, among them the effect of race components, the difference in temperaments, the age factor, the two sexes, and in connection with these there is discussed a wide range of conditions and circumstances of greatest educational value.

Many excellent suggestions are made, some of which run counter to popular belief or fads. "Exercise is not the key to health," Dr. Chancellor writes. "It is not the most important of all hygienic prescriptions; it is far from a cure-all." He further asserts that there is no proper and adequate diet for all persons even if of one type. There are too many with a fixed dietetic idea bound to convert the world to it. Nine hours sleep for the woman teacher is an excellent prescription which could lessen the evils of our rushing, strenuous age. Sleep is not a uniform phenomenon and follows interesting laws of its own. All light should be screened from the room, even starlight, and plenty of fresh, out-

door air should be moving in it. Diet is made to include fresh air as well as drink and food.

Many facts are very neatly expressed. What do we know of chocolate? Here is Dr. Chancellor's reply: "The little borrower, mild chocolate comes with a gift of his own fat for the nerves, but he takes a loan of the future all the same and a side loan from the tissues, the so-called vital reserve." "Take three hundred baths a year," is a suggestion of consequence. "What is the problem of dress?" questions Dr. Chancellor, and he answers it by noting that since it is not possible to change the garments from hour to hour, it is well to wear light or medium underwear, medium weight outer clothing, with then a choice of four outer garments.

In shoes this author conforms to the best modern opinion, namely that the very high heel is an outrage, but on the other hand that the low, flat heel of the "conventional ladies' magazine article" is only for the few women whose feet have low arches. Care of the eyes, care of the ears, care of the voice and throat are other captions in the long list of plain and authoritative discussions that the volume has brought together. It is a book of sense and utility deserving of careful consideration.

R.

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Chlorination of Water. *Joseph Race, F.I.C., City Bacteriologist and Chemist, Ottawa, Canada, New York, 1918: John Wiley & Sons, Inc. Pp. 155 illustrated. $1.50 net.*

This small book gives an historical account of the use of chlorine for the disinfection of water, a practice which, during the last twenty years, has advanced from an academic to a practical stage, due largely to the efforts of Dr. A. C. Houston in England, and Mr. G. A. Johnson, Dr. Leal and the author in America.

The book discusses the chemistry of chlorine and those of its compounds which are used for treating water, and also the methods of application used in practice, an well as the sizes of doses required and their effects upon the various water bacteria.

Particularly important is the chapter on complaints which discusses the methods of overcoming the objectionable tastes and odors which are due to the improper application of the chemical. The chapter also discusses the effect of chlorine upon animal and plant life, and upon iron, lead and other pipes used to convey solutions of it or its compounds.

Separate chapters are devoted to bleach treatment, liquid chlorine, electrolytic chlorine, hypochlorites and chloramine, respectively. These chapters are comprehensive and very little of importance to the sanitarian and the water analyst has been omitted from them. All the devices for the application of bleach are described in sufficient detail for beginners, and the chapters contain many practical notes regarding the use of the various forms of the disinfectant. The author has had the wisdom not to discuss at length devices which have become obsolete, or which are subject to serious defects. In fact the whole book is written in a spirit of fair criticism.

Particularly important is the chapter on chloramine, a process first noticed by Rideal, but developed largely by the author who, in 1915, during a series of experiments on the relative germicidal action of hypochlorites, discovered that ammonium hypochlorite not only had ten times the germicidal velocity of other hypochlorites, but that it was very unstable and decomposed into chloramine. This latter compound was found to have a higher germicidal velocity than the equivalent amount of chlorine in the form of calcium hypochlorite. The author then discovered that the chlorine in chloramine was far more efficient than the same element in the form of calcium hypochlorite, or liquid chlorine. The chapter gives an account of the author's studies and experiences at Ottawa, and it may be stated in passing that equally good results have been obtained at Denver, Colorado and on Esopus Creek on the New York Water Supply. Much of the material in the book has appeared elsewhere, but the author has performed a useful service, not only in again recounting some of his own published experiences, but in bringing together in one volume valuable data scattered through technical and scientific publications, to which abundant references are given. A bibliography follows each chapter.

The tables and illustrations in the book are very valuable, and the appendix contains useful data for the convenience of the chemist in charge of chlorination plants. A few unimportant typographical errors have been noted by the reviewer.

The book is honest and thorough and should be in the library of every sanitarian, chemist and engineer who has to do with chlorinated water, which is now being supplied to between 40 and 50 millions of people in North America alone.

R. S. WESTON.

ASSOCIATION NEWS

HEALTH EMPLOYMENT BUREAU.

Help-wanted announcements will be carried free in this column until further notice. Copy goes to the printer on the fifteenth of each month. In answering keyed advertisements, please mail replies separately.

The Health Employment Bureau also sends lists of applicants to prospective employers without charge.

For a city in New England of 67,000 a health officer. Must be a medical man. Salary to the right man $3,500 to $4,500 to begin. Address R. E. T. 323, care of this JOURNAL.

Director for new Tuberculosis Division of Indiana State Board of Health. Salary $2,000, may be increased to $2,400 if efficiency is shown. Address N. H. J. 325, care of this JOURNAL.

Assistant Diagnostician for examination of diphtheria, sputum, Neisser, Widol, etc. City laboratory. Salary $1,500. Address H. E. B. 327, care of this JOURNAL.

Full-time health officer for small city in Connecticut. Salary $3,500 per annum. Applicant must be experienced and a hustler. Address State Department of Health, Hartford, Conn.

MEETING OF EXECUTIVE COMMITTEE

The Executive Committee, A. P. H. A., met in New York City on Thursday, December 4, 1919.

Dr. L. L. Lumsden reported as the chairman of a committee appointed to consider a plan for saving 250,000 lives during the next 5 years, the committee consisting of the chairman, Dr. Haven Emerson, Dr. W. A. Evans, Dr. Lee K. Frankel and Dr. M. P. Ravenel. The report outlined the advantages and possibilities of such a campaign and recommended that the work be undertaken. After discussion it was Voted: That the report of the committee be adopted and that the present temporary committee be continued for the purpose of conferring with other organizations. The committee is to select its own chairman and to report back to the Executive Committee of the Association.

With reference to changing the printer of the JOURNAL, is was Voted: That the matter of printing the JOURNAL be referred to the President and Secretary, with power to act.

President Rankin outlined a plan for a membership campaign to be conducted with the co-operation of state health officers, each state to be a unit with a quota of new members to fill. State officers in turn were to organize their local committees for the drive.

President Rankin announced the appointment of a committee to work with committees from the American Medical Association, and the Conference of State and Provincial Health Authorities, for the purpose of promoting the movement to coordinate and enlarge Federal health activities. The action of the President was approved by the Executive Committee.

It was voted: That Dr. Frankel, Dr. Rankin and Dr. Evans be appointed a committee to visit the American Red Cross and the National Tuberculosis Association with a view to arriving at a plan of cooperation with those agencies in connection with the organization of state health societies. This committee has the power to appoint an organizer of state societies.

Voted: That the Executive Committee approve of the principle of establishing health nursing branches in state and municipal health organizations.

Voted: That the President appoint a standing committee on constitution and by-laws.

Voted: That the President appoint a committee to take up with other child hygiene organizations the question of organizing a Child Hygiene Section in the A. P. H. A.

Voted: That the A. P. H. A. become a member of the National Information Bureau with the understanding that such membership involves no financial obligation.

The question of improving and standardizing programs was discussed. The Secretary was requested to prepare a program policy for consideration by the Committee.

REPORTS OF COMMITTEES

REPORT OF THE COMMITTEE ON UNIFORM ACCOUNTING FOR HEALTH DEPARTMENTS.

In reporting for this Committee, Ernst C. Meyer, Ph.D., made note of the fact that, owing to the absence of Haven Emerson, M.D., in Europe in 1918, he had been asked to succeed Dr. Emerson as Chairman. Two new members were appointed, Allen W. Freeman, M.D., State Health Officer of Ohio, and Walter H. Brown, M.D., Health Officer of Bridgeport, Conn.

After a statement with reference to the previous report, Dr. Meyer emphasized the importance of uniform accounting as the foundation of permanent success in public health work. The text of the report follows:

It is important to emphasize that uniform accounting alone can accomplish little unless it is accompanied by, and is an integral part of a complete scheme of uniform business procedure comprising the following fundamental steps.

1. General adoption of a standardized budget.

2. Embodiment in the appropriation act of the essential plan, lacking only the details of the standardized budget.

3. Keeping accounts in accordance with the standardized appropriation act and embodying in the accounts such additional detail of the standardized budget as may seem advisable.

4. Keeping of standardized records of work done.

5. Publication of appropriate data produced by the uniform system of accounts, and the uniform records of work done in standardized report form.

The last requirement is the most important. Without a uniform method of reporting much of the value of standardized budgets, appropriation accounts and records is lost. The possibilities of usefulness of a uniform and standardized system of business records are almost unlimited. Not only will such procedure greatly facilitate the defense of health appropriations and pave the way for larger appropriations, but it will also mean larger freedom of administrative action for the health officer. The legislative appropriating authority will be far more ready to grant funds on general terms than, as is customary at present, in minute detail, because the uniformity and completeness of the business methods sketched above provides the means for accurate control over all expenditures. That such greater freedom of action tends to accompany the improvement in business methods advocated is amply shown by the experiences of states and cities in which some form of locally standardized procedure has been put into operation.

As concrete steps looking towards the attainment of the goal set, your Committee submits the following recommendations for your approval:

1. That accounts covering payments for capital outlays as for building construction, equipment of all kinds, furniture, and other 22A—Am jr pub health 2123 1-21 BEA more or less permanent properties, be kept distinct and separate from accounts covering payments for current expenses of operation and of maintenance.

2. That in publishing expenditures for lines of health work which also produce receipts through sales of products, as for example vaccines, serums, or issuance of licenses, etc., the grand total expenditures be published without previous deduction of the off-setting receipts. However, all such receipts should be so published as to indicate clearly what accounts they offset.

3. That accounts be so kept as to show clearly and separately the total expenditures for those activities which are considered by the best modern standards to be health work, and the total expenditures for activities which only indirectly or not at all affect public health, as, for example, collection of ashes, rubbish, garbage, inspection of weights and measures, of foods other than milk, of abatement of nuisances.

4. That there be published in the reports of public health officers statements of expenditures for public health done by other Government agencies, as, for example, school medical inspection and general school hygiene by educational authorities, food and drug inspection by agricultural and related bodies, industrial hygiene by industrial commissions.

5. That an advisory committee of twelve be appointed to finally formulate pronouncements upon the following fundamental matters:

1. Formulate a classification of functions for inclusion in a standard budget for health departments together with a definition of what each function includes.

2. Formulate a classification of objects of expenditures for inclusion in a standard budget for health departments.

3. Formulate a classification of activities of health departments in two classes: health work proper, and non- or near-health work.

4. Formulate a plan for the reporting on a uniform basis of physical statistics of work done.

6. That copies of the various classifications just referred to when finally adopted by the advisory committee of twelve be sent to health offices for incorporation in the business practice of their office, including budget making, drafting of appropriation acts, accounting, recording of physical statistics, and reporting.

7. That sample forms of loose leaf accounting sheets be printed and distributed to health officers who evince interest in them.

8. That the present committee, though not necessarily of course its present personnel, be continued under the broader name as a "Committee on Business Procedure" and under that title be charged with consideration of budget making, appropriating, accounting, record keeping, and reporting.

The report was presented to the Section on Public Health Administration and the section voted to approve it.

REPORT OF COMMITTEE ON RURAL HEALTH ADMINISTRATION.

Your committee wishes to make the following report and recommendations:

1. That the County be recognized as the logical unit for the development of local health departments for rural communities. We must strive to get a full-time county health officer in every county just as soon as possible, but we must recognize the necessity of making a beginning with a part-time man in certain counties. The department will gradually be developed by adding pubic health nurses and medical and sanitary inspectors, etc., as funds and public sentiment permit.

2. We recognize that it will be more desirable and easier in some states to develop the district health officer plan instead of the county plan. In the logical development of the district plan, however, we must aim to gradually reduce the size of the district until each district corresponds in area to one county. The final development of the district plan therefore leads to the county plan. With the full development of the county health departments, whether we start with the large district plan or with the county plan, it will become necessary to have district health supervisors over a given number of counties which are placed in a district. The district supervisors are connected directly with the state department of health.

3. The state department of health shall have the right to determine the competency of candidates for the positions of full-time county health officers. The actual appointments of county health officers shall be made by the county commissioners or by some other proper county authority. The state health department shall be given the right of removal from office of any local health officer who refuses or neglects to perform his duties as prescribed by either state or local laws and regulations.

4. Within the limits of authority delegated by law to the state department of health, it shall have the right of approval, modification or rejection of the plan of the scope and character of the health work contemplated by the county health department before such plan is put in operation.

5. We endorse the application of the Federal aid principles to the development of local health departments.

G. F. RUEDIGER, Chairman.
W. S. RANKIN,
W. A. EVANS,
W. R. BELL,
F. W. SEARS.

This report was presented to the Section of Public Health Administration and the section voted to approve it.

REPORT OF THE COMMITTEE ON RELATION OF THE 1920 CENSUS TO VITAL STATISTICS*

The work of the Committee during the year has been in correspondence with various vital statisticians and with officials of the Federal statistical departments on matters coming within the purview of the Committee's work.

On April 11, 1919, a letter was sent to the Director of the Census outlining the ideas of the Committee and of its correspondents on topics or heads of information to be included on the schedule for the enumeration of the population. (It will be recalled that on March 18, 1918, the Committee wrote to the Director of the Census with regard to the inclusion of

*Presented to Section on Vital Statistics, American Public Health Association, at New Orleans, La., October 27-30, 1919.

certain items in Section 8 of the Bill enabling the 1920 census). In this most recent letter we asked what would be done in 1920 to determine (1) the number of natural families and the number of children born to and surviving in such families; (2) to enumerate the survivors of the war with Germany; (3) to improve the enumeration of children at the single ages under five years (4) to provide for interdecennial censuses. Suggestions to the Director of the Census were also made as to (5) that statistics of the population in "sanitary areas" of a selected number of cities, according to nativity, parentage, color, sex and broad age groups be provided; (6) that for certain States and cities, parent-nativity, country of origin, sex and age tables be shown; (7) that nativity, color, sex and age be shown in tabulations of the statistics of the institutional population (prisons, hospitals, homes for the aged, dependent and infirm, etc.); (8) that the classification of occupations used in compiling such statistics in 1910 be revised to meet the severe criticisms leveled against it by health workers, statisticians and others; (9) that statistics of "urban" and "rural" population as defined for mortality statistics purposes be tabulated to show nativity, color, sex and age and that the mortality and birth data be published to correspond with these population figures; (10) that tabulations for at least three consecutive calendar years, preferably 1919 to 1921, be made for:

10-(a) Births, in certain registration units, by nativity, color and age of the mother, and, if the data are in the opinion of the Census Bureau fairly reliable, according to the order of birth. It was also suggested that births be tabulated by age of the father in relation to age of the mother.

10-(b) Deaths, in certain registration units, for the Abridged International List titles, by color, sex and age.

10-(c) Infant mortality; that more subdivision of the age classes under one year of age be made.

Point (10) was: That 1900, 1910 and 1920 midyear estimates for nativity, color, sex and age be shown for the population of the Registration States as constituted in 1900, for 1910 and 1920 as constituted in 1910, and in 1920 for the Registration States of that year.

(11) That monographic reviews of the decade 1900-1919 be prepared for mortality from tuberculosis, cancer, malaria, typhoid fever, pellagra, influenza and pneumonia, accidents, suicides and homicides. It was suggested that this be done by private students on invitation of the Bureau of the Census.

(12) That the International List of the Causes of Death be revised, and in such revision some place be made for the classification of accidental causes of death according to the nature of hazard obviously involved as (a) industrial hazard, (b) domestic hazard, (c) public liability hazard and (d) unknown hazard.

(13) That the life table series, with commutation columns, be continued for the decade 1910-1919 and for 1919-1921.

(14) That statistics of marriages for the leading States be collected to show marriages and remarriages according to previous conjugal condition, age and sex, perhaps color and nativity, of the contracting parties.

(15) That the Census Bureau initiate higher analysis of published population and vital statistical data after the manner of the work shown in Vol. I of the Census of Australia, 1911.

The reply of the Director of the Census to the several proposals was:

(1) *On statistics of natural families in 1920.*

"It does not seem practicable to include these inquiries in the population schedule for the fourth time, without some provision beforehand for the tabulation of the data immediately following the completion of the decennial census work. This would undoubtedly need Congressional action, and this could not be obtained now without seriously delaying the decennial census preparations. At a later date it may be possible, however, to secure authority for the tabulation and publication of the 1910 data as a part of the Bureau's regular work after the decennial census is out of the way, and in the event that an interdecennial census of population in 1925 should be authorized by Congress, the inquiries as to the natural family could be easily included in the schedule for population without seriously burdening the work of the enumerators."

(2) *Enumeration of survivors of the war with Germany*

"There is no provision of law for such an enumeration in 1920. Section 8 of the census bill was amended in the Senate to include an inquiry as to "whether or not a survivor of any war in which the United States has been engaged, and, if so, of what war" but this

amendment was stricken out by the House and Senate conferees."

(3) *Increasing accuracy of the enumeration of children under five years of age*

"The instructions to enumerators in 1910 called for the age in completed years at last birthday and the question as to age, like other questions on the schedule, related to April 15, 1910, the census day. In the case of children not 2 years old, the enumerators were also instructed to give the age in completed months, expressed in twelfths, as 3/12, 7/12, 13/12, etc. This instruction was quite generally observed by the enumerators, although not in all cases, and it may be practicable to require in 1920 a similar return of age for all children under 5 years of age."

(4) *Censuses of the population at five calendar year intervals*

"The desirability of having a more frequent enumeration of population is recognized by the Census Bureau, and it is hoped, after the completion of the decennial census work, to secure the necessary legislation for a limited census of population in 1925, to be taken in conjunction with the census of agriculture provided for in Section 31 of the Fourteenth Census Act."

(5) *Population of "sanitary areas" in selected cities*

"At the census of 1910 eight of the largest cities of the country were divided with respect to wards according to 40- and 80-acre tracts and tabulations of their population according to sex, color, general nativity, parentage and age were made for each of these tracts, but the results were not published. In the work of the census of 1920, it is the purpose to adhere to the boundaries of these tracts, even though some of them may be further subdivided, and to make similar tabulations." These eight cities and the number of tracts in each case, are as follows:

City	*Wards*	*1 Tracts*
New York	64	708
Chicago	35	431
Philadslphia	47	272
St. Louis	28	178
Boston	25	126
Cleveland	26	131
Baltimore	24	142
Pittsburgh	27	160

1 Assembly districts

(7) *Enumeration of the institutional population*

"The provision in Section 8 of the Thirteenth Census Act (1910) for the enumeration of institutional population at the time of the decennial census was omitted from the Fourteenth Census Act (1920) and this work deferred until 1922. It can then be carried on under the terms of the permanent census act, in which there is provision in Section 7, as amended by the act of June 7, 1906, for the collection decennially of statistics relating to the defective, dependent, and delinquent classes."

(8) *Revision of classification of occupations*

The Director of the Census invited statisticians to submit their views on the changes thought necessary in the classification of occupation proposed for the 1920 census. He sent a copy of the outline of the classification to the Secretary of this Committee.

(9) *"Urban" and "rural" population of the United States*

Additional statistics on these subjects are planned for 1920.

(10a) *Birth statistics*

Data mentioned in the Committee's letter was already in preparation for 1917 when the letter was received.

(10b) *Deaths by color, sex and age for titles of Abridged International List*

Data are now available in manuscript form.

(11) *Monographic reviews of mortality from principal diseases during decade,* 1910-1919

Monographs would be prepared, it was hoped, as opportunity offered.

(13) *Life tables*

Additional life tables are in preparation.

(14) *Marriage and divorce statistics*

There is now no provision of law by which statistics of marriage and divorce can be collected.

Your Committee has felt that there is not sufficient interest shown by practical health workers in population and vital statistics, *before* such statistics are collected. Usually, too much is said *after* the census publications come out, and then to no good purpose. The health worker should be constantly alert to secure a hearing for plans covering the data he needs in the practical conduct of the affairs of the health department he represents. At

present, health workers ought to urge that plans be made now for an inter-decennial enumeration of the population in 1925, and in the subjects then to be included on the schedule. They should stimulate private students to review the achievements of preventive medicine during the period included between the 1910 and 1920 censuses; they should see that local and State registrars tabulate their statistics with a wealth of detail which cannot be given in Federal reports. What, for instance, have health officials done to secure an enumeration of the natural family? There is entirely too much indifference on the part of health workers to the important subject of the decennial annual inventory of human resources.

JOHN EMERSON MONGER, M.D.,
Chairman.
WILLIAM H. GUILFOY, M.D.,
JAMES W. GLOVER,
WALTER F. WILLCOX,
WADE H. FROST, M.D.,
JOHN S. FULTON, M.D.,
WILLIAM H. DAVIS, M.D.,
EDWIN W. KOPF,
Corresponding Secretary.
CRESSY L. WILBUR, M.D.,
Honorary Member.

LIST OF NEW MEMBERS

PROPOSED FOR ELECTION TO THE

A. P. H. A.

FROM DECEMBER 21, 1919, TO JANUARY 12, 1920.

SPONSORS and THE NEW MEMBERS

Whom They Introduced
(States arranged in alphabetical order)

B. L. ARMS, M. D......Jacksonville, Fla.
W. T. LANIER, M. D.,
City Health Officer,
Miami, Fla.

M. F. HAYGOOD, M. D. .....Atlanta, Ga.
EDD R. ANTHONY, JR., M. D.,
Commissioner of Health,
Marietta, Ga.

MR. H. NORMAN OLD.....Camilla, Ga.
MR. CHARLES O. STRUSE,
Housing and Sanitation Officer,
Philadelphia, Pa.

S. J. CRUMBINE, M. D. .....Topeka, Kan.
MISS EDNA FLANAGAN,
Public Health Nurse,
Abilene, Kan.

MR. JOHN H. GREGORY.....Baltimore, Md.
MR. CLARENCE E. KEEFER,
Baltimore, Md.

MR. A. W. HEDRICH.....Boston, Mass.
MR. B. C. ROLOFF,
Exec. Sec'y Ill. Social Hygiene League,
Chicago, Ill.

PROF. W. T. SEDGWICK.....Cambridge, Mass.
JOHN B. NELSON, B. S.,
Assistant Bacteriologist, Public Service Laboratories,
Lexington, Ky.

J. F. WINCHESTER, M. D......Lawrence, Mass.
E. C. SCHROEDER, M. D. V.,
U. S. Exp. Station,
Bethesda, Md.

B. E. ROBERTS, M. D. .....Springfield, Mass.
ALAN GREGG, A. B., M. D.,
Caixa Postal 49,
Rio de Janeiro, Brazil.

MATTHIAS NICOLL, M. D. .....Albany, N. Y.
JAMES S. WALTON, M. D.,
Sanitary Supervisor,
Amsterdam, N. Y.

V. A. MOORE, B. S., D. V. M., M. D. Ithaca, N. Y.
J. G. WILLIS, B. S. A., D. V. M.,
Albany, N. Y.

LEE K. FRANKEL, Ph.D. .....New York City.
T. B. YANCEY, M. D.,
Health Officer,
Kinksport, Tenn.

VICTOR G. HEISER, M. D. .....New York City.
EDWIN W. SCHULTZ, M. D.,
Stanford Univ., Cal.

H. B. LARNER, S. B. .....Goldsboro, N. C.
R. W. SPICER, M. D.,
Goldsboro, N. C.

MR. H. W. STREEKER .....Cincinnati, Ohio.
KATHRYN D. MILLER, A. B.,
Markesan, Wis.

MISS WANDA PRZYLUSKA.....Columbus, Ohio.
LOLA G. YERKES, R. N., B. S.,
State University of Ohio,
Columbus, Ohio.

THOS. BUTLER, M. D. .....Bethlehem, Pa.
EMILY M. DINAN, R. N.,
Visiting Nurse for Red Cross,
Bethlehem, Pa.

JOHN W. WRIGHT, M. D. .....Erie, Pa.
A. G. CRANCH, M. D.,
Lawrence Park, Erie, Pa.

P. A. VAN DER MEULEN, M. D., Philadelphia, Pa.
J. BENNETT HILL, B. S., Ph.D.,
Frankford, Philadelphia, Pa.

LAWRENCE P. GEER, B. S......Columbia, S. C.
MR. JAMES HEALD,
Health Department,
Winston-Salem, N. C.

MR. T. J. ROBINSON.....Lexington, Va.
MR. MARVIN E. GORE,
Warm Springs, Va.

JOHN WEINZIRL, M. D. .....Seattle, Wash.
HERMAN A. FELDER, M. S.,
Laboratorian,
South Bend, Ind.

MR. JOHN LE FEBER .....Milwaukee, Wis.
PORTLAND-DAMASCUS MILK CO.,
Portland, Ore.

OTHER APPLICATIONS RECEIVED.

THE KOLYNOS CO. .....New Haven, Conn.
R. C. EATON, M. D. .....Chicago, Ill.
WILLIAM E. BURNS, A. B., M. S., Johnson Hospital Laboratory .....Chanuate, Kan.
L. B. GLOYNE, M. D., Health Officer,..... .....Kansas City, Kan.

D. L. McCARTY, PhG. .....Rockland, Me.
G. H. COOMBS, M. D. .....Waldoboro, Me.
JAMES J. MINOT, M. D. .....Boston, Mass.
MR. ELMORE LEFFINGWELL..New York, N. Y.
EDWARD S. McSWEENEY, M. D., Medical Director .....New York City
MISS REBECCA SHATZ.....New York City.
CHEMICAL TOILET CORPORATION..... .....Syracuse, N. Y.
C. DALIGNY, M. D.....Troy, N. C.
D. A. GREGORY, M. D. .....Ardmore, Okla.
DR. SCHOENIEBER, c/o Carter Oil Co..... .....Tulsa, Okla.
LILLIAN MAY HANSON, M. D....Portland, Ore.
RIVERVIEW DAIRY COMPANY, Atten. Chas. Eckelman .....Portland, Ore.
HARBISONS' DAIRIES .....Philadelphia, Pa.
MISS SARAH A. OLDHAM.....Philadelphia, Pa.
MOSES A. JACOBSON, B. S., M. S. A.,..... ..... Portsmouth, Va.
J. E. McDONALD, M. D.....Logan, W. Va.
EUGENIO HERNANDO, M. D., Philippine Health Service .....Manila, P. I.
V. RIVERA SAYO, A. B., M. D., District Health Officer,.....Santa Cruz, Laguna, P. I.
GEO. C. BUNKER, B. S., ...Balboa Heights, Canal Zone.
JOHN S. B. PRATT, M. D., Medical Inspector, ... Honolulu, Hawaii.
L. W. HACKETT, M. D. ..Rio de Janeiro, Brazil.
WILLARD B. SOPER, A. B., M. D., Paris, France.

Members of the A. P. H. A. elected to the various sections:

LABORATORY SECTION.

Herman B. Backers, Glenolden, Pa.

Ernest F. Badger, Milwaukee Water Works, Milwaukee, Wis.

J. H. Black, Professor and Head of Dept. of Bacteriology, Baylor Medical School, Dallas, Texas.

E. S. Bolton, Bacteriologist, Brandon, Mass.

Miss Marguerite Bond, Bacteriologist and Chemist, Brockton, Mass.

T. A. Borradaile, City Chemist, Health Department, Charleston, W. Va.

F. A. Brink, Bacteriologist, Florida State Board of Health, Pensacola, Fla.

Norbert M. Berberich, Analytical Chemist, Buffalo, N. Y.

Perkins Boynton, Bacteriologist and Chemist, Clarksburg, W. Va.

L. K. Cecil, Chemist, Oklahoma City, Okla.

L. E. Close, Bacteriologist, Massena, N. Y.

George Joseph Coleman, Ph.D., Bacteriological Chemist, Wheeling, W. Va.

Paul Owen Collins, City Chemist and Bacteriologist, Elyria, Ohio.

I. B. Crilby, Sanitary Engineer, Altoona, Pa.

William Walter DeWolfe, Bacteriologist, Fort Thomas, Ky.

R. L. Dobbin, Supt. Eng., Peterborough, Ont.

J. William Fehuel, Chemist and Bacteriologist, Lehigh University, Bethlehem, Pa.

William I. Fugate, Newcastle, Ind.

C. G. Gillespie, Director, Bureau of Sanitary Engineering, Berkeley, Calif.

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The attention of members is called to the fact that election to the sections takes place only at annual meetings. Applications should be made well in advance of the meeting to the Section Chairman.

PUBLIC HEALTH NOTES

Signing up for Health.—The American Red Cross classes in home hygiene and care of the sick attack the problem of the health of the people from a psychological and popular angle. There are traveling nurses in different sections of the country engaged in the work of organizing such classes. The women in rural places have particular interest in the movement and continual calls are made upon the nurses by the dwellers in communities who have learned of the good work in other towns or villages in the neighborhood. The general plan is to send a nurse, free of charge, to a town, who teaches those who desire her instruction in the elements of cooking for the sick and for growing children; nursing in the home, so that the lack of a skilled attendant may be felt less keenly; to which are added classes in sanitary living, public nursing, first aid and the like. It is not infrequently that a community will be in search of a public health nurse and the A. R. C. is placing such women on demand. Where there is already established some social organization competent to care for the work, the Red Cross comes in to co-operate with it, to afford it any kind of help that is needed, but many places have not yet established such agencies, and here the Red Cross undertakes the whole burden of finding some trained woman and placing her at their disposal. Such a public nurse has her work standardized and systematized so that she may make a daily visit to each home where her services may be asked for, examine school children, give good advice with reference to subnormal children, consult with expectant mothers, teach young mothers how to care for their infants, and thus take a prominent part in the life of the community. Such service is most valuable, aside from its emergency phases in its ability to undertake and accomplish the very necessary education of the public that must underlie all effective work towards the improvement of the health of the people.

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Some Pressing Public Health Problems.—At a meeting of the Society of Medical Officers of Health held in London on October 17, Dr. George Reid outlined some pressing public health problems. Besides the solution of the housing problem which is so urgent, it is important to substitute water carriage sewerage systems in all urban areas for privies and pail closets. He also urges the immediate palliation of overcrowding in houses while building schemes are in progress; also the need for more adequate control of the "dirty tenant"; the proper care of the tubercular soldier and the provision of residential institutional treatment; a more adequate control of the milk supply and the control of tuberculosis among cows.—Public Health, Nov. 1919. (*M. P. H.*).

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The Tuberculosis Problem.—In a stirring address delivered before the New England Tuberculosis Conference, Dr. Allen K. Krause, Editor of the *American Review of Tuberculosis,* speaks of the method of attacking the tuberculosis problem. "I believe that the modus operandi of any progressive movement against tuberculosis must follow this line. We must get to the people, to all the individuals who constitute society. In the language of the street, 'We must put what we know about tuberculosis across.' For all but a negligible proportion of tuberculous infections, we know to a certainty the original vehicles of infection. These are human sputum and cow's milk. There is not the least doubt concerning the method of infection by cow's milk; it is by ingestion. The method of infection by human sputum may be debatable. It seems to me that to explain the bulk of early infection we must look somewhere else than in the home. Our highways are still besmeared with the offal of the throats and lungs of myriads. And I am equally certain that every child at play in these highways, day in and day out, is putting into its mouth the sputum of others, sputum that can and does contain every variety of pathogenic micro-organism to be found in the sputum of walking men. And then we walk through all this sputum and bring it to our homes; and in the handling of our shoes even you and I have ample opportunity of acquiring others' sputum to ourselves.

Behind and ahead and on all sides of spe-

cific measures let us always project the larger vision—manifestly tuberculosis is due to anything and everything that adversely influences health.—(*D. G.*).

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Appeal for Health and Statistical Books.—A very serious loss to the scientific world was incurred through the recent destruction by fire of McCoy Hall at Johns Hopkins University, whereby the equipment and library of an important department of the School of Hygiene was lost. Just before the fire, Dr. Raymond Pearl had moved his department, that of Biometry and Vital Statistics, into the building, and with the departmental library, his own private library. These collections were almost unrivalled in their special fields. Dr. Pearl is therefore asking of his fellow scientists contributions from their stores of books and pamphlets to form the nucleus of the new collection of material on these subjects. What he is most in need of at present is in the line of vital statistics, population statistics, and statistical theory. State or federal census or health department reports will be especially welcomed, while aid in any of the allied departments will be greatly appreciated. Address Dr. Pearl at Johns Hopkins University, Baltimore, Md.—Special Notice, Public Affairs Information Service.

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Tuberculosis in New York City During 1918.—Although the campaign waged against tuberculosis has been a constant and aggressive one, and has resulted during the past twenty years in a reduction of the death rate from pulmonary tuberculosis from 239 per 100,000 population to 150, its importance as a major disease has not diminished. During 1918, out of 98,119 deaths that were reported, 10,097, or over 10 per cent, were due to tuberculosis. While only 3,332 deaths occurred from typhoid fever, measles, scarlet fever, diphtheria, whooping cough and cerebro spinal meningitis combined, there were 8,779 deaths from pulmonary tuberculosis alone. The actual number of cases of tuberculosis on record was less at the end of 1918, than at the beginning of 1917. This unusual phenomenon is supposed to be due to the drafting of 171,422 men into the service who belonged to the most susceptible age group, to the cessation of immigration due to the war, and to the migration of thousands of men and women to other communities where war industries had their alluring attractions. It is interesting to note that only 25 percent of the cases on record left their homes to receive institutional treatment. The rest remained in the family circle and doubtless constituted a source of infection. It is urged that where patients receive treatment in hospitals and sanatoria, they should not be required to overwork or overexercise. The number of homeless and lost cases of tuberculosis was quite large, numbering 8,472. This problem is created primarily by the lodging house population.

At the beginning of 1918 there were 12,218 patients under the supervision of the nurses of the Board. These nurses not only gave the usual care, but they served as connecting links between the patients and all outside agencies, to help solve financial, social and other problems affecting the welfare of patients and their families. The clinics again proved to be exceptionally efficient forces in the actual treatment and care of tuberculous patients, and represent the main line of defense in the prevention and control of the disease in the community. Day camps for children which served as prevention were also continued. Here the children were fed and given proper medical and nursing care. The mothers were instructed in proper hygiene and sanitation of the home and also in matters pertaining to diet, foods, and feeding of children. It is believed that these day camps serve a very useful purpose. Louis I. Harris, M. D. Health Department. Monthly Bulletin, N. Y. C., October, 1919—(*M. P. H.*)

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Saccharin Not a Proper Substitute for Sugar.—During the shortage of sugar which exists at the present time, attempts are being made to educate the public to the use of saccharin. The *Weekly Bulletin* of the New York City Health Department for November 22, 1919, points out that saccharin is a coal tar product, and not a food; that saccharin has no food value, and if substituted in whole or in part for sugar in a food product, it reduces, lowers, and injuriously affects the quality and strength of such food product; and that saccharin is inferior to and cheaper than sugar. It is much more desirable to substitute molasses, syrups, or other sweetening food products, having distinct food value, during the temporary shortage of sugar, than to use a substitute which is not a food, and which has no food value. (*M. P. H.*)

Army Venereal Record.—The official records indicate a lower rate of incidence of venereal disease in the American Army in France than that in the United States. An effort was made, therefore, to obtain information that would account for the low rate reported, and answer certain questions that arise, such as the percentage of chaste men among soldiers, the average number of nonprotected venereal contacts to each venereal case, and what proportion of men have been exposed without prophylactic protection. Direct inquiries to the men were more or less completely answered by 13,648 soldiers in base sections, principally at Bordeaux, St. Nazaire, Brest and Tours. From the direct answers and compilations received by Ashburn in reply he concludes that antivenereal measures are effective in the following order: 1. Those that keep men chaste. 2. Those that diminish opportunity for sexual contact. 3. Those that diminish the dangers of contact, especially venereal prophylaxis. 4. Those that exact punishment. Thirty-four per cent of the 13,648 white men, taken at random in the Service of Supply, abstained from sexual intercourse while in France, and the most important factors in this were inherent in the men rather than in the antivenereal campaign —factors such as character, religion, love, loyalty and self-respect. Another third indulged so infrequently as to render their chances of disease quite small. The stand of the commanding officer in regard to this question, and his following by his subordinates, from generals down, almost deserves the name of public opinion in its effects on the conduct of the men. The influence of work, play and amusement supplied by the Red Cross, Y. M. C. A., Knights of Columbus, etc., was also a valuable factor.—P. M. Ashburn, *Jour. A. M. A.*, Dec. 13, 1919, 1824. (*D. G.*)

✚

Typhoid Fever in the Army.—The author in a statistical discussion describes the conditions as to typhoid occurrence in the U. S. Army in the great war. The tables show a larger proportion of cases among the National Guard, due to the fact that they were mobilized in their own states and did not come directly under federal control. In 1917, the ratio in the entire army was 0.03 per thousand. In 1918 it was a little higher (0.05) owing to cases which developed in France. The mortality was eight and seven-eighths times as high, and the morbidity four and one-eighth as high among the unvaccinated as among the vaccinated. It is evident from the tables that anti-typhoid vaccination, even when performed by an untrained personnel, gave a high degree of protection under conditions of hurried mobilization and warfare and reduced the rate not only below that of previous wars, but also below that found in civil life in some of the older states where sanitation is best carried out.—F. F. Russell, *Jour. A. M. A.*, Dec. 20, 1919, 1863. (*D. G.*)

✚

Etiologic Studies in Tuberculosis.—In this experimental study an attempt was made to discover whether infection in guinea pigs at least followed exposure to what many have by inference referred to as sufficient exposure for infection of men. These experiments were carried on at Trudeau, N. Y., a health resort. The results obtained indicate that the danger of the dust in rooms in a health resort from telephone receivers, the danger from fairly well cleansed eating utensils, the danger from infected hands through hand-shaking or from knobs of doors and the danger of transmission by infected flies (at least in guinea pigs) have not yet been conclusively proved. On the other hand the danger of transmission of tubercle bacilli by kissing or through eating utensils to a second person has been borne out. —L. Brown, S. A. Petroff, G. Pasquera, *Jour. A. M. A.*, Nov. 22, 1919, 1576. (*D. G.*)

✚

The Larger Field in Tuberculosis.—Once in a great while I think I have learned a new fact; and then with full force there surges the query, What is its place in the larger field, in the conquest of consumption? The conquest of consumption—a subject that engages much of my thoughts. And whenever I brood over it, after all the fringes have been cut away, as the matter seems to take shape and stand out in the fog, I always find myself thinking in terms like these: If I had my way, if I could so order it, I should call to me my best and most sympathetic students. And I should say, Here are the facts, the premises. We have found them out here; but, confined here, they are useless. Go now out into the world and lay them before the people. Go not as Republicans or Democrats, not as individualists or communists, not as scientists or physicians. Go as men with a theme to

teach and preach. Go with only one idea, and let this idea be the persuasion. Point out the things that man must do to achieve freedom from disease; and in this demonstration let nothing deter or divert you. Follow the trail wherever it may lead; and be not fearful of the consequences. You have only one responsibility, and this is the achievement of better health for man, and in this, the holiest, most unselfish and most blessed cause that a human being can enlist in, you need suffer no misgiving concerning anything else that may occur in or because of the process of achievement.—A. K. Krause, *Amer. Rev. of Tuber.*, Nov. 1919, 513. (*D. G.*)

Ventilation of Motion Picture Theatres.—As the result of an investigation of the ventilation of motion picture theatres in Birmingham, England, the author has reached conclusions and has made some definite recommendations which are worthy of careful consideration:

(1) The existing means of ventilation in a considerable number of cinematograph exhibitions is insufficient and it is impossible adequately to ventilate buildings of this type by ducts in the roof unprovided with fans. It is only by the employment of fans that anything approaching adequate ventilation can be secured.

(2) Better ventilation could be secured in the majority of cinematograph exhibitions with the existing plant working regularly and efficiently. Interference with the fresh air inlets and failure to keep the ducts and fans clean contribute to the unsatisfactory results obtained.

(3) The area of the fresh air inlets is inadequate in many cases, and there is a tendency to close these openings.

(4) More satisfactory arrangements could be made for heating of fresh air supplied and prevention of draughts arising from the fresh air inlets by placing the radiators in front or under these openings.

(5) As regards lighting, there does not appear to be any objection to the provision of windows, provided they are properly screened.

Recommendations.

(1) That such a standard of ventilation be prescribed for the cinematograph exhibitons in the city that the ratio of carbonic acid in the air at about the breathing level should not rise beyond 20 volumes per 10,000 of air

(2) That the space allowed per person should be fixed at a minimum of 120 cubic feet.

(3) That efficient exhaust fans should be kept continuously at work during the programme.

(4) That any defects in the fans or other means of ventilation should be reported immediately to the managers, and a book provided in which a record is kept, stating the nature of the defect when it was discovered, and steps taken to have the necessary repairs effected. This record to be available for inspection by the licensing authority on application for the renewal of the license.

(5) That all fans be tested either before or immediately after being placed in position, in order to ascertain their efficiency for the work they are required to do.

(6) That an automatic indicator, such as a colored light, be fixed in a prominent position in the building indicating where the fans are working.

(7) That adequate inlet openings be provided and kept freely open in such situations as will permit of uniform distribution of fresh air, and that all means of regulating the size of these openings or of closing them be removed.

(8) That in cold weather the incoming air should be heated, otherwise unbearable draughts will be experienced.

(9) That the provision of windows and the position of entrance and exit doors be considered in relation to the flushing of the building with fresh air during intervals in the performance and during cleaning operations. —W. H. Davison, *Medical Officer*, Aug. 2, 1919, p. 39. (*D. G.*)

✚

Causes of Blindness.—The National Committee for the Prevention of Blindness has tabulated the statistics of schools and day classes for the blind in its *News Letter* for October, 1919. Among these out of a total of 3,847, 879 or 22.8 per cent were caused by ophthalmia neonatorum. Some of the other causes of blindness in the above total are: Blind from accident, 304; progressive nearsightedness, 80; trachoma, 53; interstitial keratitis, 178; optic nerve atrophy, 394; congenital cataract, 411, and other congenital causes, 556. (*D. G.*)

Typhoid Fever in Baltimore.—This subject has been considered by William T. Howard, Assistant Commissioner of Health of Baltimore, who presents in the *Municipal Journal* of Baltimore an article which is useful in showing how morbidity and mortality reports may indicate the health needs of the community.

There are many problems concerned in the study of the spread of typhoid fever. The problem of rural and urban typhoid present a number of difficulties. For a while sanitarians assumed that by instituting pure water supplies, guarding milk supplies, establishing efficient sewage disposal systems, and controlling the breeding of flies, that urban typhoid would be easily controlled. But rarely, if ever, has a city become completely typhoidless in consequence of these sanitary measures. "Residual" typhoid usually occurs, accounted for partly by typhoid carriers. A considerable number of cases is due to direct contact and a variable number is imported, especially into seaport towns and medical centres. The amount of typhoid in the extra-urban zone into which numbers of the city population go, will, of course, influence the typhoid rate of that city. In considering these statistics the number of cases infected within the city should be the standard rather than the number of cases treated and dying there.

For many years and until 1912, when the modern sanitary imrovements were first utilized there, Baltimore had a very high mortality rate. Between 1871 and 1912 the curve of the typhoid death rate was a declining one, falling from 99 to 23.87 per hundred thousand inhabitants. During the latter part of this period there was also a considerable drop in the rate in the community of rural Maryland, frequented by Baltimoreans. Since 1914 the drop in the morbidity rate and in the mortality from typhoid fever in Baltimore has been sharp and continual, until in 1918 the mortality reached the low figure of 12.2 per hundred thousand. The goal will not be reached, however, until a further large decrease has been achieved. The fall in the last six years is to be attributed largely to improvements in the water and milk supplies, elimination of privies and well contamination from this source, and the curbing of the breeding of flies. For a number of years, at least, typhoid fever in Baltimore has been preeminently a summer and autumn malady.

In 1916, Dr. Howard started to investigate the cases of typhoid fever in the city. The results of his investigations for the years 1917 and 18 are of interest:

Total number of cases, 846; infected outside the city, 195 or 23.5 per cent; infected from recent cases, 60 or 7.2 per cent; infected from old cases, 39 or 4.33 per cent; from milk, 43 or 5.8 per cent; secondary cases in the same person, 8 or 0.93 per cent; laboratory infection, 1 or 0.12 per cent. In this way the analysis of the source of infection was determined in 346 or 41 per cent of the total number of cases, leaving somewhat less than 60 per cent to be explained by other infections, such as water, flies, etc.

Up to July 1, 1919, there were reported 101 cases against 81 for the first six months of 1918. The data of these two periods, however, cannot be fairly compared, without separating the cases of 1919 into classes, those occurring in the old city, and those in the territory annexed, January 1, 1919. When this is done it is found that in the old twenty-four wards there were only 66 cases for 1919 against 81 for 1918, an actual reduction of 19 per cent. The morbidity for the same period for the old city was 21.49 per annum for 1919 against 27.01 for 1918, while for the annex during the first six months of 1919 the morbidity was at the rate of 102.5, more than five times greater than in the original twenty-four wards. The mortalities show the same diversity, 4.95 in 1919 against 6.33 in 1918 in the old city while the mortality in the annex for the first six months of 1919 was at the rate of 22.77 per annum. On account of the very high incidence in the annex the figures for the whole city for the first six months of 1919 show a higher rate than for the city in 1918.

The Baltimore authorities propose to bring the new territory up to the standard of the old city, furnishing it a supply of pure water and abandoning as soon as possible the use of wells. The proper treatment of household wastes is the second problem, while for a fundamental principle it is clearly indicated that the health department must push in all practical ways the education of the physicians and people in typhoid prophylaxis while at home and abroad.

STATE HEALTH NOTES—GENERAL

United States.—In its note of thanks to publishers, the U. S. Public Health Service through Rupert Blue, Surgeon General, the statement is made that during the last twenty years it has been possible to reduce the general death rate in the United States from 17.6 to 14.2 This represents a truly enormous saving of life. Had the condition of twenty years ago prevailed during the year just passed some 350,000 more persons would have died than actually did die. By dissemination of health educational matter the newspapers must be given credit for very material aid in this substantial achievement.

The U. S. Public Health Service has taken hold in earnest of the question of cancer, a field in which the American Society for the Control of Cancer has been at work for some years. The Service is now in active co-operation with the Society and for the "Keep Well Series, No. 6," has issued a booklet, "Cancer: Facts Which Every Adult Should Know." This is probably the first instance in which a national governmental department has entered into educational work in this line. The little pamphlet, which is to be had free on application to the U. S. P. H. S., Washington, D. C., goes into the subject in common sense fashion. The importance of very early treatment is emphasized and simple suggestions are made with reference to some of the danger signals. "Three kinds of worry" are disposed of by statements that cancer is not contagious, so far as is known, that it is practically not inherited and that it is not a blood disease. A chapter warns the reader that there is no medicine known that will cure cancer, so that advertised "cancer cures" should be avoided, since they must be "fakes." Examination by a competent doctor whenever one of two or three kinds of symptoms persist, is the safe rule, while the doctor must on his part make a thorough examination when these suspicious symptoms appear.

The Children's Bureau of the U. S. Department of Labor has appointed a permanent committee to formulate physical standards for the use of physicians who are to examine working children. The committee is the result of child welfare conferences held in Washington and other cities a few months ago. These conferences agreed upon certain minimum standards for children in employment, which are in effect, that a child shall not be allowed to go to work until he has had a physical examination by a school physician or other medical officer especially appointed for the purpose by the agency charged with the enforcement of the law, and has been found to be of normal development for a child of his age and physically fit for the work at which he is to be employed. Periodical physical examinations for all working children were also recommended. The committee that has just been appointed will determine the standards of normal development, physical fitness and health for boys and girls of specified ages:

The committee is composed of:

Emma M. Appel, M.D., Employment Certificate Department, Chicago Board of Education.

S. Josephine Baker, M.D., Chief, Bureau of Child Hygiene, Department of Health, New York City.

George P. Barth, M.D., Director of Hygiene, City Health Department, Milwaukee, Wis.

C. Ward Crampton, M.D., Dean, Normal School of Physical Education, Battle Creek, Mich.

D. L. Edsall, M.D., Dean, Harvard Medical School, Boston, Mass.

George W. Goler, M.D., Health Officer, Rochester, N. Y.

Harry Linenthal, M.D., Director of Industrial Clinic, Massachusetts General Hospital, Boston, Mass.

Anna E. Rude, M.D., Director, Division of Hygiene, U. S. Children's Bureau.

Thomas D. Wood, M.D., Chairman on Health Problems and Education, Columbia University, New York City.

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California.—Under the caption "Invest in Health," Alameda County, Calif., describes its recently established health center. The present arrangements are acknowledged to be but temporary, but it has an option on a site that is accessible to all parts of the country, plans for the building and a campaign for funds. Towards its maintenance the Board of Supervisors of Alameda County has appropriated $23,000 for the clinics of the year.

In the organization a large number of factors are interested and its Board of Governors is composed of representatives from 4 health

departments, 10 hospitals and dispensaries, 10 relief organizations, 2 educational institutions, 4 public school systems, 3 chambers of commerce, 6 public welfare organizations, 2 probation boards, 2 labor organizations, 1 bureau of occupations and the 4 county associations, medical, dental, nurses' and psychopathic; truly a body representative of many phases of the county public work.

Two excellent groups of statements have been set forth by the local committee, which define the health center and tell the reasons why it should be supported by the community. They are here presented for the benefit of other communities that may have similar organizations in prospect.

The definition of a Health Center is this:

It is an institution which co-ordinates the Public Health work of the community in a centrally-located building, available to every man, woman and child.

It conducts clinics—surgical, medical and dental—with the aim of making hospital care unnecessary.

It provides health instruction in personal hygiene to both school children and adults by means of popular lectures, lantern slides and distribution of literature.

It offers instruction in maternity and child-welfare, thus reducing the infant mortality.

It serves as a clearing house for all Public Health information, thus affecting a closer co-operation among hospitals.

It divides the community into health districts, each with a definite health organization which can instantly be mobilized in case of a threatened epidemic.

It prevents overlapping, duplication and waste because it co-ordinates all health and relief organizations.

The ten reasons why every community should establish and support a health center are:

1. It promotes community health. Your own safety depends upon healthful surroundings.

2. It reduces loss of income caused by sickness. Earning power rests upon health.

3. It decreases infant mortality.

4. It fosters health education. One school child out of two is defective; three out of four have defective teeth.

5. It reduces labor turn-over—makes fewer hands to train.

6. It mobilizes the forces of public health and welfare.

7. It increases wealth. A healthy community is a good banking community.

8. It prevents epidemics.

9. It protects the home. A healthy home produces a more efficient worker, a more contented citizen.

10. Public health is purchasable. A community to a large extent can determine its own death rate.

This Public Health Center is under the directorship of Richard A. Bolt, M.D.; it is caring for a couple of thousand cases a month at its Health Center, No. 1; it has been made the out-patient department of the new County Hospital and it acts through its Division of Tuberculosis as the clearing house for the Arroyo Sanatorium.

✚

Colorado.—The Denver Anti-Tuberculosis Society has issued in a letter to the New York Department of Health a warning to those afflicted with tuberculosis that should have the widest circulation, especially among those of slender means who think of seeking the state of Colorado on account of its climate. The Society states that each year several hundred tuberculous persons without funds come to Denver, hoping to improve their health. Since Colorado has no state hospital for this class of patients and the city of Denver has merely 35 beds at the county hospital for tuberculous residents, the accommodations for those who came from outside are limited to a few free private sanatoria, and these are always so overtaxed that admittance is a long and difficult matter.

Thus it is that the tuberculous poor who migrate to Denver find no place where they can be cared for, and they are forced to look for light work in order to maintain themselves; but the demand for such work is far in excess of the supply. Driven to any work they can get, they rapidly grow worse and usually soon die. They die for the lack of proper rest, food, fresh air and medical attention:—the essentials of treatment which many of them could have had at home.

A communication such as this makes clear the necessity of pushing various state and county tuberculosis programs with greater rapidity, for if care were available to all, its is not likely that many would attempt the long trip away from their home, family and friends.

Florida.—There are about 6,500 school teachers in the state and to them the State Board of Health has given a series of six lessons in health. These are to be passed on in turn to the school children, of whom there are about 325,000. Thus the authorities hope to establish the foundation for wide-spread public health education. A campaign is under way for county health boards and for eradication of malaria. Another campaign is among the citizens, to persuade them to see that all members of the family subject themselves to a thorough medical examination at least once in two years.

The work of the ambulatory clinic in Florida has been extended and is important. It has just completed a round in one of the most remote rural districts of the state. Among sawmills and turpentine camps more than 200 active syphilitics were treated and restored to a salary-drawing status. About 50 negroes, who were absolute objects of charity, are now doing their daily work and drawing pay. The next matter laid out for the clinic is at the State Penitentiary at Raiford, where it is said that 90 per cent of the convicts show positive Wassermanns. These men will be turned over to the State Road Department for labor, and it is proposed to have them put into good shape.

✚

Illinois.—The prophesy that the influenza epidemic would be responsible for an increase in deaths from all causes seems to be borne out by the statement in the November 8th Bulletin of the Chicago School of Sanitary Instruction, which states:

"Comparing totals of both cases and deaths from all causes with those for October of last year, there is every reason for satisfaction and thankfulness as to general health conditions. This applies, as stated, only to the general totals. The detailed figures for the month outside of two diseases, influenza and pneumonia, show increases rather than decreases over those of the corresponding month of last year. This means, of course, that eliminating the epidemic conditions for the month of October of last year, October of this year has been rather above the normal as to both the morbidity and mortality status." —(*M. T.*)

✚

Indiana.—The Tuberculosis Division of the Indiana State Board of Health was in action the first week in January. The efforts of this division will for the first year be entirely upon one point of the many which are to be attacked in order to prevent the white plague. The Division will be supplied with an extensive special exhibit and with a motor truck having a panel body and with an enclosed front for winter use. This will carry the exhibit and the personnel of the force—four in number—about the country. This outfit will conduct an intensive campaign based on the fact that 80 per cent of tuberculosis is acquired in childhood.

✚

Kansas.—The Kansas Tuberculosis Association during 1920 will organize local associations in every county where it meets any response whatever from local enthusiasts. Dr. Seth L. Cox is the medical director or field organizer in charge of this work. During the year 1919 the association employed eight district nurses, who have done a great variety of work including school nursing, district nursing, making addresses to clubs and other organizations, and promoting the work of the Modern Health Crusade.

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Maine.—Five free clinics for persons who are unable to pay for treatment but are suffering from venereal disease are already established in Maine. Two more are nearly ready to be opened and several more are in prospect, according to Dr. H. E. Hitchcock, director of the Division of Venereal Diseases of the State Department of Health. The clinics which are already opened are the Augusta Health Center, Dr. G. A. Coombs; Mason Dispensary, Portland, Dr. G. A. Pudor; Eastern Maine General Hospital, Bangor, Dr. H. J. Hunt; Bath Health Center, Dr. L. T. Snipe; Dr. Miner's Hospital, Calais, Dr. W. T. Miner. Rockland and Waterville are two cities where a clinic of this type will soon be in operation.

Physicians are very generally awaking to the value of the police powers of the Health Department in suppressing the use of the so called patent or proprietary remedies. Also in some communities, splendid success is being attained where police and health board work is combined and free treatment offered.

One of the difficulties that have been encountered by the State Health Commissioner, L. D. Bristol, M.D., in the work of the regis-

tration of babies lies in the fact that parents delay for weeks sometimes to choose a name for the baby. After reasonable delay, the report is sent in and often reaches Augusta without the name which renders the record useless. Then of course it must be sent back to the clerk or doctor from whom it came. Parents are urged to facilitate in every way the efforts of the Division of Vital Statistics to preserve such valuable records concerning their children.

To show the importance of registration the Maine State Board of Health gives the following advantages which result from registration:

It will enable the baby later to prove:
His age for school purposes.
His age for employment purposes.
His right to marry.
His right to vote.
His right to hold public office.
His right to inherit property.

✣

Massachusetts—In his inaugural address Governor Calvin Coolidge set forth some plain principles of public health, emphasizing the fact that unsound moral, social and economic doctrines have no place in the healthy body. Here are some of his ideas on the conservation of Public Health.

"Along with economy of resources should go conservation of the public health. The physical well-being of a people is the foundation for all advancement. Lack of bodily vigor is the beginning of a state's decadence in all things. With a people in a sound physical condition all things are possible. Great progress has been made in medical science and skill, and relief has been found from many of the terrors of disease. But too little attention has been given to full bodily development, which after all is not a matter of accident, of heredity or environment, but of intelligent training. This work should be attacked with great vigor in all our schools. We cannot breed a race of weaklings and hope to survive in any of the world competitions.

"It has, besides, a moral aspect. The unsound social and economic theories which deluge the earth from time to time are not the progeny of stalwart men and women. Sound bodies do not breed that kind of unsound doctrines. Along with a vigorous training for physical development should go a teaching to think healthful thoughts. For after all it must be remembered that 'as a man thinketh in his heart so is he.'

"For some years Massachusetts has been committed to the policy of aiding children by assisting the mother to care for them. This has proved to be a wise and beneficial policy. Institutional and family care have much to commend them, but no mother should be parted from her children on account of poverty alone. This policy may well be extended in its scope to the giving of aid, nursing and medical care to needy expectatnt mothers. Motherhood should be honored, childhood protected. I earnestly recommend the extension of this relief through the same or like agencies as now administer mothers' aid. In our desire to assist those who come from other shores we must not neglect the native born. Coming into the royal estate of every American, he should have a royal welcome. It was the wise men who bore gifts. A wise commonwealth will not be neglectful of the days of nativity."

✣

Minnesota.—In this state the State Teachers' Association has taken an important action with reference to public health in the adoption of a formal resolution, the text of which follows:

"We recommend that each town and city school system organize a department of hygiene that the health and strength of the children of the State may be developed and conserved. Moreover, we desire that such Health Instructions given by the teacher shall be motivated in such a way as to function in the formation of fundamental health habits; and that the children of the State may the better protect themselves against infectious diseases. We further recommend that rural schools organize committees of hygiene as soon as possible in co-operation with Physicians of the vicinity."

The Association recognizes and commends the work of the Junior Red Cross and that of the Missouri Tuberculosis Association and requests the co-operation of all teachers with the latter organization in the Modern Health Crusade.

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New Mexico.—Reports of an alleged epidemic of chickenpox in Sierra County were

investigated by Dr. G. S. Luckett, Chief of the Division of Preventable Diseases, and it was found that mild smallpox has been prevalent for several months without being recognized. Quarantine and vaccination are giving the health officer the upper hand over the outbreak.

The State law requires the vaccination of every child of school age against smallpox. In spite of many handicaps this work is being well carried out in general. Some county health officers have had to travel a hundred miles in their own counties to reach outlying schools.

An amendment to the health law is to be introduced at the coming special session of the Legislature which will permit every county and city to levy sufficient funds to support adequate local health administration. This will permit full-time county units in many parts of the State. In fact, several counties are considering such organizations already.

On January 5 the first free venereal disease clinic for the State was opened at Santa Fè. Three local physicians, Drs. J. A. Massie, R. O. Brown and E. W. Fiske, are giving their services free. Rooms have been furnished by the City Council in the City Hall. The city health officer of Deming, Dr. S. D. Swope, reports that the County Medical Society has agreed to support a free venereal disease clinic for that town. Operations will begin in the near future.

Miss A. Metzger of Santa Fé has been assigned to the local Red Cross Chapter for duty under the city and county health department as public health nurse. Miss Metzger has just completed a course of training for her new duties, after spending a year of war service in the embarkation hospital at Liverpool.

✝

New York City.—The anti-tuberculosis work in the city, which, for seventeen years, has been thoroughly and energetically carried on by the Committee on the Prevention of Tuberculosis of the Charity Organization Society, has been taken over by a new and larger corporation, the New York Tuberculosis Association, Inc. All the members of the old committee, including such prominent workers in the tuberculosis field as Dr. Hermann M. Biggs, State Commissioner of Health; Dr. Royal S. Copeland, Health Commissioner of New York City; Mr. Lee K. Frankel, Dr. S. S. Goldwater, Mr. Thomas W. Lamont, Dr. S. A. Knopf, and others, are members of the Board of Directors of the new Association.

The objects of the Association are: The study of tuberculosis and of the means of preventing it; the dissemination of knowledge as to the nature of the disease, its causes and the methods of its prevention and its treatment; the promotion of adequate facilities for the prevention of tuberculosis and for the care, treatment and economic rehabilitation of persons afflicted therewith, and the co-ordination of the work of public and private agencies engaged in any of the foregoing activities.

A broad program of education, publicity, preventive work among children, of home treatment and after-care, co-ordination of existing clinics and of relief agencies, will be developed by experienced secretaries. A novel addition, in co-operation with the Federal Vocation Board, will be the opening of a workshop where, under the best sanitary conditions and medical supervision, arrested cases of tuberculosis will be restored to productive capacity under healthful surroundings.

Through its Bureau of Preventable Diseases the New York City Health Department has recently conducted a series of demonstrations of the technique of the Schick test and its interpretation, for the benefit of all private physicians who desire to become acquainted with the application of this test. These demonstrations were conducted at some twenty health centers throughout the city. It is hoped that as a result of these demonstrations the physicians will become better acquainted with the Schick test and use it quite largely in their practice. The test when combined with active immunization by toxin-antitoxin, is bound to become a measure of great importance in the prevention of diphtheria.

The Municipal Health Department is again appealing to the physicians of the community to persuade their patients to have all members of their families successfully vaccinated against smallpox, and to urge upon all the value and desirability of at least one vaccination after puberty. The absence of smallpox causes a diminution in the practice of

vaccination and with this diminution comes a greater opportunity for the reappearance of this disease. An increase in vaccination gradually banishes smallpox.

A recent census shows that there are approximately 8,500 crippled children in the Borough of Brooklyn alone. Every one of these needs special attention. Some need special treatment, others special training or instruction to fit them for whatever positions their handicaps allow. As yet the facilities for the care of such cases are totally inadequate, and the crippled child is not receiving the attention due it.—(*M. T.*)

✣

New York.—This state is going seriously into the matter of establishing health districts in which a number of adjoining towns cooperate in maintaining one health board and full-time health officer for the group. The recent consolidations of the kind are:

Village of Corfu and town of Pembroke; towns of German, McDonough, Pharsalia and Preston; town of Ogden and village of Spencerport; towns of Clarksville, Cuba and New Hudson; and the village of Oneida Castle joins with Vernon Consolidated Districts.

Miss Ruth Gilbert, Bacteriologist in charge of the diagnostic branch of the State Laboratory Service, recently began a series of visits to the local laboratories of the State. It was planned to have each laboratory engaged in public health work inspected before January first, when annual certificates of approval were issued. Under the Public Health Law and Sanitary Code it is necessary for all such local laboratories in the State outside of New York City to be approved by the State Commissioner of Health in order to have their reports accepted as official.

At a special meeting of the Plattsburg Chapter of the American Red Cross, it was voted to employ a County Community Nurse for general public health work. Contributions were received from West Chazy, Lyon Mountain and Ellenburg branches, to be used for this purpose.

The 1920 budget of the city of Amsterdam will contain an appropriation for the full time employment of a public health nurse. During 1919, only enough money was appropriated to pay for the employment of a nurse during the summer months.

It is proposed to establish a county laboratory at Amsterdam. The Visiting Nurses' Association of Watertown, which has been conducting a child welfare clinic and instructing young women in the care of children, has added to its public spirited work by opening a pre-school clinic. A recent survey in Schenectady County proved that of 120 cases examined 14 per cent were positive and 29 per cent suspected.

At the Executive Committee meeting of the Cobleskill Chapter of the American Red Cross, it was voted to secure the services of a public health nurse for Cobleskill and vicinity. Two thousand dollars was appropriated for the salary of a nurse for the coming year.

Samples of home-canned corn supposed to have caused the death of five persons—a mother and four children at Fine, N. Y., recently, have been submitted to the laboratory for examination.

✣

North Carolina.—The city of Goldsboro has entered into an agreement with a private corporation with reference to the establishment of an abattoir and packing house within the city limits. Regulations for the conduct of this new establishment include the following:

1. That all meat not Government inspected shall be inspected at this abattoir.

2. That the city shall regulate the fees charged for the slaughtering of cattle, hogs, etc.

3. That all slaughtering shall be done under Government regulations, under supervision of the city and at hours set by the city.

4. That should the city at any later date decide to erect a municipal slaughter house that this private corporation shall pay to the city inspection fees, the amounts to be determined later.

At a special meeting of the Board of Aldermen, this year, $6,600 was appropriated for the purpose of carrying on anti-malarial work during 1920. This amount represents half of the money required, the remaining half to be furnished by the State Board of Health and the International Health Board. The U. S. Public Health Service, as its share, will contribute the services of a sanitary engineer who will supervise the work. Should the

demonstration prove satisfactory it was further agreed that the city should appropriate annually during 1921, 1922 and 1923 the sum of $4,000, the sum estimated as being necessary to maintain the yearly work.

✚

North Dakota.—In a recent Bulletin of the State Board of Health it is stated that "Letters are going to be sent to many of the cities and towns in close proximity to the several laboratories, inviting them to let us make weekly bacteriological examinations of their water supplies."

In commenting on this notice a prominent Eastern sanitary engineer said, "It seems a great pity that in these times, when the public health should be so carefully protected, that it should be deemed necessary to ask permission of any municipality to make bacteriological examinations of its water supplies. These supplies should be under a constant supervision of the State, either with or without the consent of the municipality."

✚

Ohio.—The situation in Ohio is interesting for the reason that the Griswold Act, which amended the Hughes Act with reference to the new districting of the State, caused village and town boards of health to go out of existence automatically on January first. It was enacted so late in the session that preliminary organization in the townships could not get under way in time for the new officials to take up the work where the older boards dropped it.

Emphasizing the need for haste in reorganization, the State Department of Health has called attention to high prevalence of diphtheria, measles, whooping cough and scarlet fever in December. It is feared that much unnecessary loss of life may result if adequate control measures are not carried out promptly by district boards of health.

To get the new health organization into operation in a county, the district advisory council must fill vacancies on the board of health (except in 38 counties whose original Hughes Act boards hold over in their entirety), the board of health must adopt a new budget, the advisory council must approve this budget and the board of health must select a health commissioner and any other necessary employees.

The State Department of Health has communicated with all members of district boards of health, mayors, township chairmen, county auditors and county prosecutors, explaining their duties under the amended law and strongly advising against delay.

More than 3,000 cases of measles were reported in December, twice as many as in November and more than in any December of the previous five years. Measles prevalence in 1920 is expected to rival that of 1916, when there were 56,000 reported cases and 782 deaths. Strict quarantine will reduce the danger.

Diphtheria, whooping cough and scarlet fever show high prevalence this winter. Several of the most severe local outbreaks are in villages and rural districts which are at present unprotected.

Under a law passed by the recent Legislature the Ohio State Sanatorium is expected to be nearer self-support than ever before. The following schedule is in effect: Pay patients, not less than the minimum ($5 per week), nor more than the maximum ($25 per week); patients admitted upon request of industrial concerns, one-half of full per capita cost; patients admitted upon request of county commissioners, one-half per capita cost; patients admitted upon request of bureau of war risk insurance, full per capita cost; patients, admitted upon request of charitable, philanthropic, benevolent and anti-tuberculosis societies, minimum to one-half per capita cost.

✚

Oklahoma.—Dr. D. Long of Duncan, Okla., has just been appointed by Arthur R. Lewis, State Health Commissioner of Oklahoma, as Director of the Tuberculosis Bureau of the Health Department. One of Dr. Long's first duties will be to tabulate and classify each and every case of tuberculosis within the state. He will also have supervision of the construction of the three tuberculosis sanatoria, two of which will be built during 1920.

Mr. John Harrison, Oklahoma City, assumed the duties of State Health Inspector on January 1.

✚

Utah.—The Department of Public Instruction, Division of Health Education of the State has pointed out to the citizens the dangers of under weight among children. Seven per cent below the normal in the weight of the child is considered evidence of malnutrition. The schools are urged to weigh the

children and to bring to the supervision of the medical inspectors the cases of under weight. Such cases, it is suggested, should be subject to a thorough examination by the health supervisor in conjunction with the family physician and the mother. The Division is making use of the Alphabet of the Child Research Organization, while the pamphlet by the same association on the "Standards of Growth and Nutrition,' is to be in the hands of every supervisor.

The University of Utah proposes to extend its benefits to the people of the state who are unable to attend its regular courses, by teaching hygiene, sanitation and the prevention of diseases, through extension courses.

It will also emphasize methods of preventing physical defects and the correction of such defects as are corrigible, so as to make for the highest physical efficiency.

The methods to be adopted will be popular health lectures or courses of lectures, exhibits, educational motion picture entertainments and the distribution of health literature. These activities are to be conducted in schools, churches, amusement halls, clubs, etc., with the support and under the auspices of any and all organizations interested in the work.

No less than twenty such courses will be given together with motion pictures and lectures with the lantern. The University proposes further to make sanitary surveys covering milk supply, water supply, sewage disposal and kindred subjects. Traveling exhibits will be a part of the program, which will be the motif for a Health Week. Villages and towns will be encouraged to institute a program in hygiene and sanitation, with a view of approaching as nearly as possible the ideal. Civic pride in these matters will be developed.

The University has organized a Mothers' Club for the benefit of the mother or the expectant mother. Twenty-four bulletins have been issued; one for each month during the period of gestation and the remainder of the twenty-four bulletins cover the care of the child until the end of its second year. An enrollment fee of $1.00 is charged those who join the Mothers' Club, in order to cover the expense of postage and mailing of these bulletins.

✣

Wisconsin.—The city of Oshkosh has opened a health center with Bertha V. Thomson, M.D., Health Commissioner of the city, at its head. It has a great variety of clinics including medical, nervous diseases, tuberculosis, stomach, heart, genito-urinary, children, eye, ear, nose and throat, skin diseases and those of women. Each has special hours assigned for it with a group of physicians and a staff of nurses.

CONVENTIONS, CONFERENCES, MEETINGS

February 27-28, Trenton, N. J., New Jersey State Health Officers' Association.

March —, Chicago, American Conference on Hospital Service.

March —, Wilmington, Del., Delaware State Health Association.

March 1, Salt Lake City, Utah, Utah Nurses' Association.

March 5, Providence, R. I., Rhode Island Medical Society.

March 8-13, Dallas, Texas, State Dental Association.

March 17-19, Burlington, Vt., State Dental Society.

March 22-23, New York City, New York State Medical Society.

April 6, Newark, N. J., State Nurses' Association.

April 12-17, Atlanta, Ga., National Organization for Public Health Nursing.

April 14-21, New Orleans, La., National Conference of Social Workers.

April 14-21, New Orleans, La., American Association of Hospital Workers.

April 19, Charlotte, N. C., North Carolina State Health Association.

April 20-22, Charlotte, N. C., Medical Society of North Carolina.

April 20-22, Anniston, Ala., Medical Association of the State of Alabama.

April 22-24, St. Louis, Mo., National Tuberculosis Association.

April 26-30, New Orleans, La., American Medical Association.

April 27, Huntington, W. Va., West Virginia State Health Association.

April 29-30, Bismarck, N. D., State Nurses' Association.

May 11, American Association of Eugenics.

May 11-12, Indianapolis, Ind., Indiana State Health Association.

May 20-24, Brussels, Belgium, Congress of the Royal Institute of Public Health (English).

INDUSTRIAL HYGIENE AND OCCUPATIONAL DISEASE

Abstracted by Drs. E. R. Hayhurst, R. P. Albaugh, P. M. Holmes, and E. B. Starr.

Industrial Health and Efficiency.—This final report of the British Health of Munition Workers' Committee comprises a bulletin of 374 pages as prepared by the U. S. Bureau of Labor Statistics. The chief subjects discussed are relation of fatigue and ill health to industrial efficiency, employment of women, hours, rest spells, incentive, canteens, sickness and ill health, injuries and accidents, industrial diseases, industrial health hazards and welfare supervision both within and outside the factory. An appendix of over one hundred pages copies the memoranda of various special investigators.—Bulletin 249, *U. S. Bureau of Labor Statistics*, Washington, D. C.

✣

Physical Defects Among 10,000 British Recruits.—This article is a summary in relation to age, types and location of defects. The conclusions are: (1) Physical defects worthy of note are present in four-fifths of the adult male population; (2) many of these develop after the age of 18 years (three men out of four are fit for general military service at age 18, but only two out of four by age 23); (3) many of the defects are preventable or curable, *e.g.*, defective teeth in 20 per cent of men, varicose veins in 5 per cent, hernia in over 3 per cent, deformities of limbs in 7 per cent, skin diseases in 3 per cent.; (4) "There appears to be great scope for improvement of the general physique of the nation by medical examination of and attention to, children and adolescents as regards tooth, eye and ear defects, deformities, and early diagnosis of chest diseases and of congenital defects."—John D. Comrie, *The Lancet*, November 29, 1919, pp. 957-960.

✣

Safeguarding Workers in the Tanning Industry.—This special Bulletin of 121 pages, illustrated, points out that there are about 250,000 engaged in the leather industry in the United States, some 55,936 of whom are in the tanning and leather trades, the remainder being principally shoemakers and harnessmakers, and the neglect of safety work is conspicuous in the industry. The purpose of the pamphlet is to outline steps which should materially reduce the hazards involved in tanning and leather production. The information is based on personal visits to tanneries, on correspondence and on a wide study of publications. A number of large industries coöperated to the fullest extent in preparing the Bulletin.—*Working Conditions Service*, U. S. Department of Labor, Grant Hamilton, Director General, Washington, D. C.

✣

Munitions Intoxicants in France.—This is a technical article prepared with great care by Dr. Perkins under the auspices of the (U. S.) National Research Council. Study of the effects of various chemical combinations and radicals, portals of entry into the human system, factors of susceptibility, clinical histories, findings of experimental work, and a series of appendices comprise the report.—Roger G. Perkins, *U. S. Public Health Reports*, October 24, 1919, Vol. 34, No. 43, pp. 2335-2374.

✣

Arsenid Poisoning in Submarines.—The correspondent summarizes the reports of hydrogen arsenid in submarines, the severity of which compelled one boat to return to its base at the end of four days. The source of the harmful arsenious gas was at first believed to be in the sulphuric acid used in the batteries but was ultimately traced to an alloy in the battery grids. The gas increased as the batteries got old. The two symptoms most complained of were vomiting and dyspnea, the color of the urine varied from brown to blood red. Jaundice was a constant sign. The nervous symptoms were slow in appearance but took from two to three weeks to pass off. Arsenic was found in the urine, hair and nails. —London Letter, *Jour. A. M. A.*, October 11, 1919, pp. 1148.

✣

Velocity of Carbon Monoxid Poisoning.—"Gertz' calculations show that the toxic action of carbon monoxid develops comparatively slowly at first. With twenty normal respirations—about one minute's time—there is no

risk of asphyxia or of loss of consciousness unless the air contains very large amounts of carbon monoxid."—H. Gertz, (Stockholm), *Jour. A. M. A.*, October 11, 1919, pp. 1172.

✣

Ford Motor and Ship Plants Reduce Accidents 75 to 83.5 Percent.—While markedly reducing accidents, production was also increased by installing iron-dust suction systems. The finishing operation of Ford pistons created iron dust which resulted in a request to be transferred to other work, from 25% of the entire membership of this department. After installing a dust suction system such transfers dropped to 3% a month or the average throughout the plant. "Of course the health of the men was greatly improved and the inception of many tuberculosis cases stopped."—*Safety News, National Safety Council*, Dec. 1, 1919, No. 312, p. 2.

✣

The Heart Disease Defective.—There is a class of young men of usually healthy appearance who nevertheless suffer from a group of symptoms following mild exercise, characteristic of impaired heart conditions, who might not ever have been discovered except from the Army Draft which caused young men to be examined physically. These men have no complaints, as a rule, which leads them to seek medical advice. They tend to drift into the lighter occupations and the majority are surprised when told that there is something really the matter with them. They are a class of constitutional inferiors rather than that there is any common cause for their impaired hearts. These types of cases are distinct from those who have had past disease recognized as likely to result in heart trouble. —Louis M. Warfield, *Amer. Jour. Med. Sc.*, August, 1919, pp. 165-178.

✣

Review of Methods for the Study of Dust Content of Air.—No single method of air sampling for dust content, as yet devised, is ideal. For complete studies and for fixing of permissible limits of dustiness, tests must permit of estimating weights and counts and determinations of the physical and chemical nature and size of dust particles. These tests are at present best and most easily made on samples collected with the Palmer apparatus, though the sugar filter samples treated according to Muir and Johnson's technic give as much information. Some other tests have distinct values for certain purposes. The article has a full bibliography.—Henry F. Smyth, *Jour. of Indus. Hyg.*, July, 1919, pp. 140-148.

✣

Effects of the Inhalation of Dust.—This comprehensive article should be read in the original to appreciate its contents and significance. Among other important deductions the author questions whether organic dusts of any type are injurious from a mechanical standpoint. Diseases produced by organic dusts are probably due to inorganic material mixed with such dusts, direct poisonous properties excluded. The higher incidence of tuberculosis among those exposed to inorganic dusts is due to the fact that the dust acts as a convenient carrier of tubercle bacilli. But dust is only incidental and the universal tendency is to emphasize the danger of dust and to forget the tubercle bacillus. The dust might be eliminated and yet the persons exposed to the danger of tuberculosis when active cases expectorate freely about the working place. The author believes tobacco dust to be free from that industry because of economic reasons. The efficiency of the respiratory tract as a filter for bacteria was shown by Strauss, who found that exhaled air contained only 40 bacteria when inhaled air held over 20,000. The mouth breather is at a great disadvantage. The symptoms and physical signs, X-ray findings and pathology are detailed.—H. R. M. Landis, *Jour of Ind. Hyg.*, July, 1919, pp. 117-139.

✣

Back Strain—An Accident or a Disease?—The author indicates the lines along which the analysis of any given case of "back strain" must proceed, and demonstrates through excellent X-ray reproductions, factors which contribute to solution. A previous faulty structure or defect up to the time of a given accident has usually been unsuspected and unfelt. Static conditions, birth defects, accidents and disease constitute the primary causes. Each of these is concisely discussed. —Robert B. Osgood, *Jour. of Ind. Hyg.*, July, 1919, pp. 117-139.

✣

Hours of Work as Related to Output and Health of Workers.—This study was made in connection with typical metal manufacturing industries principally by questionnaires sent out, from which replies were received from

1,252 establishments employing 753,561 workers. Out of these, 413 establishments employing 358,336 workers had reduced hours and furnished data as to the effects of such reduction. Conclusions are not complete for the reason that the time study was too brief. However, the death rate from tuberculosis in certain branches of the industry is high. The death-rate from occupational and chronic poisoning is almost insignificant according to the U. S. Census figures. Tuberculosis among gas workers, tinplate and tinware workers is especially high. Statistics show an unusually high death-rate from pneumonia as well as tuberculosis in the moulder's trade. These branches, however, employ a relatively small proportion of the workers in the industry but it is obviously incumbent upon industrial managers to look closely into these matters. There is considerable evidence to indicate that there is a definite connection between the prevalence of tuberculosis and inadequate nourishment and poor housing conditions.—*Research Report No. 18, Nat. Industrial Conference Board,* 10 Beacon St., Boston.

✣

New Hazards in Electric Arc Welding.—While the effect of the electric arc upon the eyes has been adequately provided for, the harmful effect of the light rays upon the tissues of the human body has had little attention. The invisible rays (ultra-violet and infra-red) are those which are harmful. The painful body burns, it has been found, are not due to the infra-red rays which are only irritating, and rather uncomfortable and fatiguing, but not especially dangerous. Whether the harmful rays are the ultra-violet *per se* or the rays in that part of the spectrum where the X-ray is found has not been determined. Ordinarily where work is done in the open, in shops, or in places where special screens are erected the hazards are not great. But on board ship, in close quarters where surroundings are often covered with red lead, the dangers of the light rays appear to be greatly increased. Complaints of burns on the neck and chest occur within a few hours. Those on the back of the neck appear to be caused by reflected rays from the red lead painted surfaces. A worker who was supplied with a bandage lined with lead foil had no further burns, whence it was decided that the ultra-violet rays were the cause of the trouble. Burns were not nearly so noticeable in compartments which had not been red-leaded. Cancer may be the ultimate results of such burns. As a further precaution, all welding should be done before surfaces are red-leaded.—Alfred W. Jansen, abstracted from "Safety" by *Monthly Labor Review,* May, 1919.

✣

Medical Features of Industrial Relations.—A practical plan for including the medical features of industrial relations in a typical American plant (Richmond, Indiana), which has had some experience, is described by George Hodge, on pp. 64-66 of *Hospital Management* for September, 1919. In addition to the medical phase, betterment, accidents and insurance are discussed. "The fundamental principle of our Industrial Relations Department is based on the golden rule."

✣

Instruments for Showing the Presence and Amount of Combustible Gas in the Air.—New forms of instruments have been devised by Weaver and Weibel of the *U. S. Bureau of Standards* (Scientific Paper, No. 334, 90 pp.) for determining the presence and amount of such gases as hydrogen, carbon monoxide, illuminating gas, methane and others. The apparatus devised operates an alarm for any desired percentage of combustible gas. The initial cost of construction of the apparatus is not great; it is portable and the indicating instrument may be located at a distance as well as the alarm. The apparatus, when once properly calibrated, will indicate changes of concentration of hydrogen smaller than can be detected by the methods of gas analysis commonly used in commercial practice.

✣

Rubber Gloves Urged for Ice Cream Workers.—Because of the effect of ice and salt upon the human skin Wm. A. Hays advises the wearing of rubber gloves for ice cream workers. "Salt extracts water from the tissues and also causes a deposit of moisture from the air on same tissues; it is impossible to dry any substance impregnated with salt. Salt and ice combined produce a rapid freezing agent, which has a deleterious effect on the skin, acting in the same manner as a burning agent."—Bulletin, *New York State Industrial Commission,* Vol. 4, No. 9, June, 1919, p. 175.

PUBLIC HEALTH LABORATORY NOTES

Abstracted by FRANCIS H. SLACK, M. D., and MR. JAMES M. STRANG.

Isolation of Typhoid and Paratyphoid Organisms in Water Supplies.—In this note the authors give an account of their method based on the employment of malachite-green broth for the isolation of such organisms in water supplies, the method having been employed daily for some time in the routine testing of the water supply of Paris. Several litres of the water to be tested are filtered through a collodion filter to concentrate the germs, and a suspension of the deposit on the surface of the filter is made in 50 cc. of sterile saline. A 6 per cent peptone water, to which has been added 3 cc., of sterile bile and 2.5 cc. of a 0.5 per cent solution of malachite-green, is then inoculated with the suspension, and the mixture incubated at 37° C. for twenty-four to forty-eight hours. Five tubes, each containing 25 cc. of nutrient agar to which 0.5 cc. of a 10 per cent solution of subacetate of lead has been added for every 10 cc. of agar, are melted in a water-bath at 46° C. and each inoculated in succession, without recharging the needle, with a loopful of the malachite-green culture. The tubes, after shaking to distribute the microbes, are poured on Petri plates. When the latter have set, to each is added the contents of a tube of 40 cc. of ordinary nutrient agar at 46° C. with the object of permitting anaerobic culture of bacilli in the lead agar. When set anew, the plates are incubated at 37° C. and the development of colonies followed. *B. typhosus* and *B. paratyphosus* B grow as brown colonies surrounded by a pale halo, whilst *B. coli* grows as a colony hardly at all brown and without halo. *B. pyocyaneus* also develops as colonies having the same appearance at *B. paratyphosus B.* The brown colonies with halos are isolated and differentiated by subculturing in peptone water (indol and agglutination), on an agar slope (Gram staining), on neutral-red glucose agar, on litmus lactose agar, and in litmus milk.

The authors assert that their method permits B. *Typhosus* and B. *paratyphosus* B to be determined with certainty in 50 cc. of Seine river water taken at Paris. If, instead of lead agar, litmus lactose agar is employed, the results are not so good, in the proportion of 347 colonies having to be isolated from the latter medium, as against 64 colonies from the former, in order to demonstrate the presence of 10 typhoid or paratyphoid bacilli.—Dienert F., Guillerd A., Leguex A., Comptes Rendus, CLXVI, 84 (*D. G.*).

Colloidal Gold Test in Public Health Work.—Throughout the studies of the past two years, careful attention has been given to the comparative value of the colloidal gold and other spinal fluid reactions. Lee and Hinton are of the opinion that the gold test is much more delicate than the spinal fluid Wassermann reaction and for the same reason some have expressed their belief that reactions typical in the "Luetic Zone" confirm the clinical suspicions of central nervous system lues, even though the Wassermann is repeatedly negative; moreover, such reactions may foreshadow the outbreak of a latent lues and may prove quite as valuable as the "Provocative salvarsan reaction." Whenever the colloidal gold reaction is absolutely negative, all other reactions are also negative in the vast majority of cases. There is, however, a close relationship between an increased globulin content and positive colloidal gold reactions. No strong color changes in colloidal gold occur with fluids that give a negative globulin test. On the other hand, positive globulin tests are rarely observed in spinal fluids that give negative or weak gold curves.

Detailed directions are given for the preparation of colloidal gold solutions.—W. E. Zielinski, *N. Y. State Jour. Med.*, 1919, 195. (*D. G.*)

✚

A New Double-Way Syringe for Use in Intravenous Medication, Transfusion and Aspiration.—The barrel of this syringe is the same as in all glass syringes, but the plunger has a bore running throughout its entire length with the upper end drawn out so that a rubber tubing may be securely attached. The needle is also attached with rubber tubing. By compression of the tubing at either end, according to the purpose desired, the syringe may be repeatedly filled or emptied in either direction. H. O. Ruh, *Jour. of Lab. & Clin. Med.*, Nov., 1919, p. 123.

(Continued on Page XX, Advertising Section)